Physics Abstracts

CLASSIFICATION AND CONTENTS
(PACC)

0000	general
0100	communication, education, history, and philosophy
0110	announcements, news, and organizational activities
0110C	announcements, news, and awards
0110F	conferences, lectures, and institutes
0110H	physics organizational activities
0130	physics literature and publications
0130B	publications of lectures(advanced institutes, summer schools, etc.)
0130C	conference proceedings
0130E	monographs, and collections
0130K	handbooks and dictionaries
0130L	collections of physical data, tables
0130N	textbooks
0130Q	reports, dissertations, theses
0130R	reviews and tutorial papers;resource letters
0130T	bibliographies
0140	education
0140D	course design and evaluation
0140E	science in elementary and secondary school
0140G	curricula, teaching methods,strategies, and evaluation
0140J	teacher training
0150	educational aids(inc. equipment,experiments and teaching approaches to subjects)
0150F	audio and visual aids, films
0150H	instructional computer use
0150K	testing theory and techniques
0150M	demonstration experiments and apparatus
0150P	laboratory experiments and apparatus
0150Q	laboratory course design,organization, and evaluation
0150T	buildings and facilities
0155	general physics
0160	biographical, historical, and personal notes
0165	history of science
0170	philosophy of science
0175	science and society
0190	other topics of general interest
0200	mathematical methods in physics
0210	algebra, set theory, and graph theory
0220	group theory(for algebraic methods in quantum mechanics, see 0365; for symmetries in elementary particle physics, see 1130)
0230	function theory, analysis
0240	geometry,differential geometry, and topology(0400 relativity and gravitation)
0250	probability theory,stochastic processes, and statistics(0500 statistical physics)
0260	numerical approximation and analysis
0270	computational techniques(for data handling and computation, see 0650)
0290	other topics in mathematical methods in physics
0300	classical and quantum physics;mechanics and fields
0320	classical mechanics of discrete systems general mathematical aspects(for applied classical mechanics of discrete systems, see 4610; for celestial mechanics, see 9510)
0330	special relativity
0340	classical mechanics of continuous media' general mathematical aspects
0340D	mathematical theory of elasticity(4620 continuum mechanics, and 4630 mechanics

of solids)

0340G   **fluid dynamics; general mathematical aspects(4700 fluid dynamics)**

0340K   **waves and wave propagation; general mathematical aspects(46.30M mechanical and elastic waves, 4320 general linear acoustics)**

0350   **classical field theory**

0350D   **Maxwell theory: general mathematical aspects(for applied classical electrodynamics, see 4100)**

0350K   **other special classical field theories**

0365   **quantum theory; quantum mechanics(0530 quantum statistical mechanics;for relativistic wave equations, see 1110)**

0365B   **foundations, theory of measurement, miscellaneous theories**

0365C   **formalism**

0365D   **functional analytical methods**

0365F   **algebraic methods (0220 group theory; 3115 calculation methods in molecular physics)**

0365G   **solutions of wave equations: bound state**

0365N   **nonrelativistic scattering theory**

0365S   **semiclassical theories and applications**

0370   **theory of quantized fields(1110 field theory**

0380   **general theory of scattering(1120 s-matrix theory, and 1180 relativistic scattering)**

0400   **relativity and gravitation(for special relativity, see 0330; for relativistic astrophysics, see 9530; for relativistic cosmology, see 9880)**

0420   **general relativity(0240 geometry and topology)**

0420C   **fundamental problems and general formalis**

0420F   **canonical formalism, agrangians, and variational principles**

0420J   **solutions to equations**

0420M   **conservation laws and equations of motion**

0430   **gravitational waves and radiation: theory**

0440   **continuous media; electromagnetic and other mixed gravitational systems**

0450   **unified field theories and other theories of gravitation**

0455   **Alternative theories of gravitation**

0460   **quantum theory of gravitation**

0465   **supergravity**

0470   **Physics of black holes (see also 9760L Black holes)**

0480   **experimental tests of general relativity and observations of gravitational radiation**

0485   **Intermediate range forces (inc. fifth and sixth forces)**

0490   **other topics in relativity and gravitation**

0500   **statistical physics and thermodynamics(0250 probability theory, stochastic processes, and statistics)**

0520   **statistical mechanics**

0520D   **kinetic theory**

0520G   **classical ensemble theory**

0530   **quantum statistical mechanics(6700 quantum fluids, and 7100 electron states in condensed matter)**

0530C   **quantum ensemble theory**

0530F   **fermion systems and electron gas**

0530J   **boson systems**

0530L   **Anyons and parastatistics (quantum statistical mechanics)**

0540   **fluctuation phenomena, random processes, and Brownian motion**

0545   **Theory and models of chaotic systems (for chaos in flowing systems, see 4752)**

0547   **Nonlinear dynamical systems and bifurcations （ bifurcations in flowing systems, see 4752）**

0550   **lattice theory and statistics; Ising problems(7510H ising models)**

0555   **Fractals （fractals in flowing systems, see 4752 ）**

0560   **transport processes:theory**

0565   **Self-organized systems**

0570   **thermodynamics(4460 thermodynamic processes,6400 equations of state, hase**

equilibria and phase transitions, 6500 thermal properties of condensed matter for chemical thermodynamics, see 8260)

0570C	thermodynamic functions and equations of state
0570F	phase transitions: general aspects
0570J	critical point phenomena
0570L	nonequilibrium thermodynamics, irreversible processes(3430 potential energy surfaces, 8200 physical chemistry)
0590	other topics in statistical physics and thermodynamics
0600	measurement science,general laboratory techniques, and instrumentation systems
0620	metrology
0620D	measurement and error theory
0620F	units
0620H	measurement standards and calibration
0620J	determination of fundamental constants
0630	measurement of basic variables
0630C	spatial variables measurement(inc.measurement of all variables extending in space e.g. diameter, weight,thickness, displacement, surface topography, particle size, area of disperse systems)
0630E	mass and density measurement
0630F	time and frequency measurement(for astronomical aspects see 9570)
0630G	velocity, acceleration and rotation measurement(for flow velocity measurement see 4780)
0630L	measurement of basic electromagnetic variables(0750 electrical instruments and techniques
0630M	Measurement of mechanical variables (inc. elastic moduli, force, shock, strain, stress, torque, and vibration) （for pressure measurement, see 0630N; for acoustic variables measurement, see 4385D; for measurement in the mechanics of solids, see 4630R; for viscosity measurement, see 4780; for materials testing, see 8170 ）
0630N	Pressure measurement(for vacuum measurement, see 0730D; for high-pressure techniques, see 0735)
0650	data handling and computation (0270 computational techniques; 2980 nuclear information processing; for optical data processing, storage and retrieval see 4230; for geophysical data acquisition and storage see 9365)
0650D	data gathering, processing, and recording, data displays including digital technique
0650M	computing devices and techniques
0660	laboratory techniques
0660E	sample preparation
0660J	high-speed techniques (microsecond to picosecond)
0660S	micromanipulators,micropositioners, and microtomes
0660V	workshop techniques (welding, machining, lubrication, bearings, etc.)
0660W	safety(2880 radiation monitoring and protection, 8760M radiation dosimetry, 8760P radiation protection)
0670	general instrumentation
0670D	sensing and detecting devices
0670E	testing equipment
0670H	display, recording, and indicating nstruments
0670M	transducers(for electromagnetic radiation transducers see 0762; for acoustic transducers see 4388; for flow transducers see 4780)
0670T	servo and control devices
0690	other topics in measurement science, general laboratory techniques and instrumentation systems
0700	specific instrumentation and techniques of general use in physics(within each subdiscipline for specialized instrumentation and techniques)
0710	mechanical instruments and measurement methods(for measurement in the mechanics of solids, see 4630R; for materials testing, see 8170)
0710C	Micromechanical devices and systems （for micro-optical devices and technology, see 4283)

0710F	Vibration isolation
0710Y	Other mechanical instruments and techniques (inc. pendulums, gyroscopes, centrifuges)
0720	thermal instruments and techniques(4450 thermal properties of matter, 4460 thermodynamic processes;for radiometry and detection of thermal radiation see 0760d and 0762)
0720D	thermometry
0720F	calorimetry
0720H	furnaces
0720K	high-temperature techniques and instrumentation; pyrometry
0720M	cryogenics
0725	hygrometry
0730	vacuum production and techniques(inc. pressures below 1 atmosphere;4745 rarefied gas dynamics; 8115G vacuum deposition)
0730B	evacuating power, degasification,residual gas
0730C	vacuum pumps
0730D	vacuum meters
0730G	vacuum apparatus and testing methods
0730K	auxiliary apparatus, hardware and material
0735	high pressure production and techniques(inc. pressures above 1 atmosphere)
0750	electrical instruments and techniques
0755	magnetic instruments and techniques
0758	magnetic resonance spectrometers, auxiliary instruments and techniques (6116N EPR and NMR determinations)
0760	optical instruments and techniques(for radiation detection, see 0762; for spectroscopy and spectrometers, see 0765; for holography, see 4240; for optical sources and standards, see 4272; for optical lens and mirror systems, see 4278; for optical devices, echniques and applications, see 4280; for optical testing and workshop techniques, see 4285; for radiation spectrometers and spectroscopic techniques, see 2930; for radiation measurement, detection and counting,see 2970)
0760D	photometry and radiometry(inc. colorimetry;0762 detection of radiation)
0760F	polarimetry and ellipsometry
0760H	refractometry and reflectometry
0760L	interferometry
0760P	optical microscopy
0762	detection of radiation (bolometers, photoelectric cells, i.r. and submillimetre aves detection)
0765	optical spectroscopy and spectrometers(inc. photoacoustic spectroscopy)
0765E	UV and visible spectroscopy and pectrometers
0765G	IR spectroscopy and spectrometers
0768	photography, photographic instruments and techniques(for light sensitive materials see also 4270 for chemistry of photographic process see also 8250)
0775	mass spectrometers and mass spectrometry techniques(for mass spectroscopic chemical analysis,see 8280)
0777	particle beam production and handling; targets(2925 in elementary-particle and nuclear physics, 4180 particle beams and particle optics)
0779	Scanning probe microscopy and related techniques (inc. scanning tunnelling microscopy, atomic force microscopy, magnetic force microscopy, friction force microscopy, and near-field scanning optical microscopy) (structure determination aspects, see also 6116P)
0780	electron and ion microscopes and techniques(in condensed matter 6116D electron microscopy, 6116F field ion microscopy)
0781	Electron and ion spectrometers and related techniques (see also 2930 Radiation spectrometers and spectroscopic techniques)
0785	x-ray, gamma-ray instruments and techniques(inc. Mossbauer spectrometers and techniques)
0788	Particle interferometry and neutron instrumentation(for particle beam

production and handling, see 0777; for neutron spectrometers, see also 2930H; for atomic interferometry, see also 3580; for particle optics, see also 4180)

0790	other topics in specialised instrumentation
1000	the physics of elementary particles and fields(for cosmic rays, see 9440; for high energy-experimental techniques and instrumentation, see 2900)
1100	general theory of fields and particles(0365 quantum mechanics, 0370 theory of quantized fields, 0380 general theory of scattering)
1110	field theory
1110C	axiomatic approach
1110E	Lagrangian and Hamiltonian approach
1110G	renormalization
1110J	asymptotic problems and properties
1110L	nonlinear or nonlocal theories and models
1110M	Schwinger source theory
1110N	gauge field theories
1110Q	relativistic wave equations
1110S	bound and unstable states; Bethe-Salpeter equations
1110W	Finite temperature field theory
1117	Theories of strings and other extended objects (inc. superstrings and membranes)
1120	S-matrix theory
1120D	scattering matrix and perturbation theory
1120F	dispersion relations and analytic properties of the s-matrix
1130	symmetry and conservation laws(0220 group theory)
1130C	Lorentz and Poincare invariance
1130E	charge conjugation, parity, time reversal and other discrete symmetries
1130J	SU(2) and SU(3) symmetries
1130K	su(4) symmetry
1130L	other internal and higher symmetries
1130N	nonlinear and dynamical symmetries (spectrum-generating symmetries)
1130P	supersymmetry
1130Q	spontaneous symmetry breaking
1130R	chiral symmetries
1140	currents and their properties
1140D	general theory of currents
1140F	lagrangian approach to current algebras
1140H	partially conserved axial-vector currents
1150	dispersion relations and sum rules
1150E	n/d method
1150G	bootstraps
1150J	crossing symmetries
1150L	sum rules
1150N	multivariable dispersion relations(inc. Mandelstam representation)
1160	complex angular momentum; Regge formalism(0380 general theory of scattering, 1240 in strong interactions)
1180	relativistic scattering theory (0380 general theory of scattering)
1180C	kinematical propertie(helicity and invariant amplitudes, kinematic singularities, etc.)
1180E	partial-wave analysis
1180F	approximations (eikonal pproximation, variational principles, etc)
1180G	multichannel scattering
1180J	many-body scattering and Faddeev equatio
1180L	multiple scattering
1190	other topics in general field and particle theory
1200	specific theories and nteraction models; particle systematics
1210	unified field theories and models
1210B	Electroweak theories
1210C	Standard model of unification

1210D	**Unified models beyond the standard model (inc. GUTs, technicolour and SUSY models)**
1220	**models of electromagnetic interactions**
1220D	**specific calculations and limits of quantum electrodynamics**
1220F	**experimental tests of quantum electrodynamics**
1225	**models for gravitational interactions(0460 quantum theory of gravitation)**
1230	**models of weak interactions**
1230C	**neutral currents**
1230E	**intermediate bosons**
1235	**composite models of particles**
1235C	**general properties of quantum chromodynamics (dynamics, confinement, etc.)**
1235E	**applications of quantum chromodynamics to particle properties and reactions**
1235H	**phenomenological composite models of particle structure and reactions (partons, bags, etc.)**
1235K	**other composite models(inc. composite quarks and leptons)**
1240	**models of strong interactions**
1240E	**statistical models**
1240F	**bootstrap models**
1240H	**duality and dual models**
1240K	**hadron classification schemes**
1240M	**complex angular momentum plane; Regge poles and cuts (reggeons)(1160 for general theory)**
1240P	**absorptive, optical, and eikonal models(for diffraction and diffractive production models, see 1240S)**
1240Q	**potential models**
1240R	**peripheral models (one or morearticle exchange)**
1240S	**multiperipheral and multi-Regge models(inc. diffraction and diffractive production models)**
1240V	**vector-meson dominance**
1270	**hadron mass formulas**
1290	**miscellaneous theoretical ideas and model**
1300	**specific reactions and phenomenology**
1310	**weak and electromagnetic interactions of leptons**
1315	**neutrino interactions(inc.interactions involving cosmic rays)**
1320	**leptonic and semileptonic decays of mesons**
1320C	**pi decays**
1320E	**k decays**
1320G	**psi/j, upsilon, phi mesons**
1320H	**B meson leptonic/semileptonic decays**
1320I	**f meson leptonic/semileptonic decays**
1320J	**other meson decays**
1325	**hadronic decays of mesons**
1330	**decays of baryons**
1330C	**leptonic and semileptonic decays**
1330E	**hadronic decays**
1335	**decays of leptons**
1338	**decays of intermediate bosons**
1340	**electromagnetic processes and properties**
1340D	**electromagnetic mass differences**
1340F	**electromagnetic form factors; electricnd magnetic moments**
1340H	**electromagnetic decays**
1340K	**electromagnetic correctionso strong and weak interaction processes**
1360	**photon and harged-lepton interactions with hadrons(for neutrino interactions, see 1315)**
1360F	**elastic and Compton scattering**
1360H	**total and inclusive ross sections(inc. deep-inelastic processes)**
1360K	**meson production**

1360M	**meson-resonance production**
1360P	**baryon and baryon resonance production**
1365	**hadron production by electron-positron ollisions**
1375	**hadron-inducedow- and intermediate-energy reactions and scattering, energy <=10 ge(for higher energies, see 1385)**
1375C	**nucleon-nucleon interactions, including antinucleon, euteron, etc. (energy <=10 gev)(for n-n interactions in nuclei, see 2130)**
1375E	**hyperon-nucleon interactions (energy <=10 GeV)**
1375G	**pion-baryon interactions (energy <=10 GeV)**
1375J	**kaon-baryon interactions (energy <=10 GeV)**
1375L	**meson-meson interactions (energ<=10 GeV)**
1380	**Photon-photon interactions and scattering**
1385	**hadro-induced high- and super-high-energy interactions, energy = 10 GeV(forow energies, see 1375)**
1385D	**elastic scattering (energy = 10 GeV)**
1385F	**inelastic scattering, two- article final states (energy = 10 GeV)**
1385H	**inelastic scattering, many- article final states (energy=10GeV)**
1385K	**inclusive reactions, including otal cross sections, (energy = 10 GeV)**
1385M	**cosmic ray interactions(9440 cosmicays)**
1385N	**Hadron induced very high energy interactions (E > 1 TeV)**
1387	**Jets in large-Q2 elementary particle interactions**
1388	**polarisation in interactions and cattering**
1390	**other topics in specific eactions and phenomenology of elementary particles**
1400	**properties of specific particles and esonances**
1420	**baryons and baryon resonances(inc. ntiparticles)**
1420C	**neutrons**
1420E	**protons**
1420G	**baryon resonances with s=0**
1420J	**hyperons and hyperon resonances**
1420P	**dibaryons**
1440	**mesons and meson resonances**
1440D	**pi mesons**
1440F	**k mesons**
1440K	**rho, omega, and eta mesons**
1440L	**d and f mesons**
1440M	**a and b mesons**
1440N	**psi/j, upsilon, phi mesons**
1440P	**other mesons**
1460	**leptons**
1460C	**electrons and positrons**
1460E	**muons**
1460G	**neutrinos**
1460J	**heavy leptons**
1480	**other and hypothetical particles**
1480A	**photons**
1480D	**quarks and gluons**
1480F	**intermediate bosons**
1480H	**magnetic monopoles**
1480J	**Supersymmetric particles (inc. scalar particles, sparticles and –inso)**
1480K	**others(inc. tachyons)**
2000	**nuclear physics**
2100	**nuclear structure**
2110	**general and average properties of nuclei; properties of nuclear nergy levels(for properties of specific nuclei listed by mass ranges,ee 2700)**
2110D	**binding energy and masses**
2110F	**shape, charge, radius and form actors**
2110H	**spin, parity, and isobaric spin**

2110J	**spectroscopic factors**
2110K	**electromagnetic moments**
2110M	**level density and structure**
2110P	**single particle structure in levels**
2110R	**collective structure in levels(inc. otational bands)**
2110S	**coulomb effects**
2130	**nuclear forces(1375C nucleon-nucleonnteractions)**
2140	**few-nucleon systems**
2160	**nuclear-structure modelsnd methods(for hadronic atoms and molecules, see 3610)**
2160C	**shell model**
2160E	**collective models**
2160F	**models based on group theory**
2160G	**cluster models**
2160J	**Hartree-Fock and random-phase pproximations**
2165	**nuclear matter**
2180	**hypernuclei**
2190	**other topics in nuclear structure**
2300	**radioactivity and electromagneticransitions(8255 radiochemistry)**
2320	**electromagnetic transitions**
2320C	**lifetimes and transition probabilities**
2320E	**angular distribution and correlation easurements**
2320G	**multipole mixing ratios**
2320J	**multipole matrix elements**
2320L	**gamma transitions and level energies**
2320N	**internal conversion and extranuclear effects**
2320Q	**nuclear resonance fluorescence**
2340	**beta decay; electron and muon capture**
2340B	**weak interaction and lepton aspect of beta decay**
2340H	**nuclear matrix elements and nucleartructure inferred from beta decay**
2360	**alpha decay**
2390	**other topics in nuclear decay and adioactivity**
2400	**nuclear reactions and scattering:general**
2410	**nuclear reaction and scattering models andethods**
2410D	**coupled-channel and many-body-theory method**
2410F	**plane- and distorted-wave born pproximations**
2410H	**optical and diffraction models**
2430	**resonance reactions and scattering**
2430C	**giant resonances**
2430F	**isobaric analog resonances**
2450	**direct reactions**
2460	**statistical theory and fluctuations**
2470	**polarization in reactions and scattering**
2475	**general properties of fission**
2485	**Quark models in nuclei and nuclear processes**
2490	**other topics in nuclear reactions andcattering: general**
2500	**nuclear reactions and scattering:specific eactions**
2510	**nuclear reactions and scattering nvolving few-nucleon systems**
2520	**photonuclear reactions and photon scatterin**
2530	**lepton-induced reactions and scattering**
2530C	**electron and positron ractions and cattering**
2530E	**muon reactions and scattering**
2530G	**neutrino reactions and scattering**
2540	**nucleon-induced reactions andcattering(2820 neutron physics)**
2540C	**elastic proton scattering**
2540D	**elastic neutron scattering**
2540E	**inelastic proton scattering and (p, n)eactions**

2540F	inelastic neutron scattering and (n,) reactions
2540G	single nucleon transfer reactions
2540J	few nucleon transfer reactions
2540L	radiative capture
2540P	reactions and cattering above meson production thresholds (energies = 400 MeV)
2540S	spallation reactions
2550	2h and 3h induced eactions and scattering
2550D	elastic, inelastic and charge xchange reactions
2550G	single-nucleon transfer reactions
2550J	few nucleon transfer reactions
2560	3he and 4he nduced reactions and scattering
2560C	elastic, inelastic and charge xchange reactions
2560E	single-nucleon transfer reactions
2560F	few nucleon transfer reactions
2570	heavy ion induced reactions and scattering
2570B	reaction mechanisms
2570D	few nucleon transfers
2570E	resonances
2570G	compound nucleus properties and decays
2570H	elastic, inelastic, and charge xchange reactions
2570J	Fusion and fusion-fission reaction
2570K	Coulomb excitation
2570N	Fragmentation and relativistic collisions
2580	meson- and hyperon-induced reactions nd scattering
2585	fission reactions
2585C	spontaneous fission
2585E	neutron induced fission
2585G	charged particle induced fission
2585J	photofission
2587	Nuclear fragmentation
2588	fusion reactions
2590	other topics in nuclear reactionsnd scattering: specific reactions
2700	properties of specific nuclei listedy mass ranges
2710	a <=5
2720	6 <=a <=19
2730	20 <=a <=38
2740	39 <=a <=58
2750	59 <=a <=89
2760	90 <=a <=149
2770	150 <=a <=189
2780	190 <=a <=219
2790	220 <=a
2800	nuclear engineering and uclear power studies(8610 energy resources and their utilisation)
2820	neutron physics(2540 nucleo-induced reactions and scattering)
2820C	neutron scattering
2820F	neutron absorption
2820H	neutron diffusion
2820L	neutron moderation
2841	fission reactor theory and design
2841C	computer codes
2841D	Fission reactor design
2841E	Fission reactor theory and physics
2842	fission reactor materials
2842D	fuel elements
2842H	fuel preparation and eprocessing(inc. isotope separation and enrichment)

2842K	radioactive astes(2875 radioactive waste, transportation, disposal, storage, reatment)
2842N	coolants
2842P	moderators
2842Q	structural and shielding materials
2842R	Fission reactor coolant circuit materials (inc. steam generator tubes)
2843	fission reactor operation
2843B	cooling and heat recovery
2843D	core control and guidance
2843F	Fission reactor maintenance and outages
2843G	Fission reactor control rooms (inc. design and operator training)
2843H	instrumentation and experiments with ission reactors
2844	fission reactor protection 1ystems, safety and accidents
2846	Nuclear materials: safety aspects
2846C	Nuclear safeguards (inc. material accountancy and security)
2846E	Nuclear criticality safety
2846G	Packaging and transportation of nuclear materials
2847	fission reactor decommissioning
2850	fission reactor types and applications
2850D	research, test and training reactors
2850F	fast reactors(inc. breeder reactors)
2850G	light water reactors
2850I	gas cooled reactors
2850J	heavy water reactors
2850K	propulsion reactors
2850P	power plants
2852	fusion reactors(for confinement, see 5255)
2852C	ignition
2852F	materials
2852J	theory and design(inc. particle ransport)
2852L	instrumentation
2852N	Fusion reactor safety
2858	integrated reactor systems
2858C	synergetic fission reactor systems
2858E	fission & fusion systems
2858G	spallation breeders
2870	nuclear explosions(4740 shock and etonation phenomena)
2875	adioactive waste, transportation, disposal, storage, treatment(for aste generated in fission reactors see also 2842)
2880	adiation technology, including shielding(8760 medical and biomedicalses of fields, radiations and radioactivity)
2880C	dosimetry
2880F	radiation monitoring and radiation protectio
2890	other topics in nuclear engineeringnd nuclear power studies
2900	experimental methods and nstrumentation for elementary-particle and nuclear physics
2910	preacceleration (injection)
2915	electrostatic and linear particle ccelerators
2915B	electrostatic accelerators
2915D	linear accelerators(inc. electron ing accelerators)
2920	cyclic accelerators nd storage facilities(for plasma accelerators, see 5275)
2920D	storage rings
2920F	betatrons
2920H	cyclotrons
2920J	synchrocyclotrons
2920L	synchrotrons
2921	Beams in particle accelerators (inc. characteristics, dynamics and handling)

2925	particle sourcesnd targets, preparation and technology(0777 particle production and andling; targets)
2925B	electron sources
2925C	ion sources: positive, egative and polarized
2925D	neutron sources
2925E	radioactive sources
2925F	beam handling, focusing, 1ulsing and stripping, etc
2925G	nuclear bombardment targets
2925K	polarized targets
2930	radiation spectrometers and spectroscopic echniques
2930D	heavy charged-particle spectroscopy
2930E	alpha-ray spectroscopy
2930F	beta-ray spectroscopy
2930H	Heutron spectroscopy
2930K	x- and gamma-ray spectroscopy
2940	radiation detectors(for mass pectrometers, see 0775)
2940B	ionization chambers
2940C	Proportional counters; multiwire proportional chambers
2940D	cloud chambers
2940F	bubble chambers
2940H	spark chambers and other track chambers
2940K	Cerenkov detectors
2940M	scintillation detectors; cintillators and photomultipliers
2940P	semiconductor detectors
2940R	nuclear emulsions
2940S	Geiger tubes
2940T	position sensitive detectors
2940W	Solid-state nuclear track detectors (inc. plastic and cellulose nitrate detectors)
2940X	Superconducting particle detectors
2960	counting circuits and nuclear electronics
2960C	basic function units; supply nits, amplifiers, etc
2960E	pulse counting assemblies; ounting scalers, analyzers, etc
2960G	pulse circuits
2960J	radiation monitors
2970	radiation measurement, detection and counting(2930 radiationpectrometers and spectroscopy, 2940 radiation detectors for osimetry, see 8760M)
2970D	angular correlation techniques
2970F	coincidence techniques (see also 0660J high-speed techniques)
2970G	energy loss and energy range relations
2970J	integral methods of radiation detection
2975	polarization analysis
2980	nuclear information processing
2980C	computer systems
2980F	programming
2990	other topics in high-energy anduclear experimental methods and instrumentation
3000	atomic and molecular physics(for hysical chemistry, see 8200)
3100	theory of atoms and molecule(7100 electron states in condensed matter)
3110	general theory of structure, ransitions and chemical binding
3115	general mathematical and computational evelopments
3120	specific calculations and results
3120A	Ab initio calculations (atoms and molecules)
3120B	SCF and HF calculations (atoms and molecules)（DF calculations, see also 3130J ）
3120C	Coupled cluster calculations (atoms and molecules)
3120D	complete ab initioalculations (exact or nearly exact calculations on small species)
3120E	ab initio LCAO and GO SCF alculations
3120G	other accurate, or nearly ab initio calculations (DIM method, SAMOethod, X α method etc.)

3120H Xalpha methods (atoms and molecules)

3120J Local density approximation (atoms and molecules)

3120L statisticalodel calculations (THOMAS-FERMI and THOMAS-FERMI-DIRAC models)

3120N semi-empirical ndoalculations (CNDO, INDO, MINDO, PCILO methods, etc.)

3120P otheremi-empirical calculations (Huckel, generalized Huckel, PPP methods,tc.)

3120R valence bond calculations(ab initio or not ab initio)

3120T electron correlation and CI calculations

3120W empirical methods (nonquantum methodsor conformations)

3130 electronic structure, correctionsnd effects of interactions

3130G hyperfine interactions and isotope ffects

3130J radiative and relativistic effects

3130L environmental and solvent effects

3130N molecular solids

3150 excited states

3190 other topics in he theory of atoms and molecules(inc. properties other than energy)

3200 atomic spectra and interactions withhotons

3220 atomic spectra grouped by wavelength anges

3220D radiofrequency and microwave spectra

3220F infrared and raman spectra

3220J visible and ultraviolet pectra(for fluorescence and phosphorescence spectra, see 3250)

3220R x-ray spectra

3240 magnetic resonance spectra

3250 fluorescence, phosphorescence; adiationless transitions

3250F fluorescence, phosphorescence(inc. uenching)

3250H radiationless transitions

3260 magneto-optical and electro-optical spectra

3260S stark effect

3260V zeeman effect

3270 spectral line shapes and intensities

3270C oscillator strengths, transition moments

3270F lifetimes, absolute and relativentensities, transition probabilities

3270J line shapes, widths, and shifts

3280 photon interactions with atoms

3280B level crossing, optical pumping, opulation inversion

3280D autoionization

3280F photoionization, photodetachment, hotoelectron spectra

3280H auger effect and inner-shell ionization

3280K multiphoton processes

3280P Optical cooling of atoms; trapping

3290 other topics in atomic pectra and interactions with photons

3300 molecular spectra and interactions ith photons

3310 calculation of molecular spectra

3310C alculational methods(inc. new theoretical techniques and applicationsf group theory)(0365 algebraic methods in quantum mechanics)

3310E rotational analysis

3310G vibrational analysis

3310J vibrational-rotational analysis

3310L vibronic, ovibronic, and rotation-electron-spin interactions

3320 molecular spectra grouped by wavelength ranges(for agneto-optical and electro-optical spectra, see 3345; for luorescence and phosphorescence spectra, see 3350; for photoelectronpectra, see 3365)

3320B adiofrequency and microwave spectra(for NMR spectra, see 3325; for pr spectra, see 3330)

3320E infrared spectra

3320F	**Raman and Rayleigh spectra(inc. cattering)**
3320K	**visible spectra**
3320L	**ultraviolet spectra**
3320N	**vacuum ultraviolet spectra**
3320R	**X-ray spectra**
3325	**nuclear magnetic resonance and elaxation; nuclear quadrupole resonance (NQR)**
3325B	**relaxation phenomena**
3325D	**chemical shifts**
3325F	**nuclear spin interactions, uadrupole effects and nuclear coupling**
3325H	**chemically induced dynamic nuclear olarization (CIDNP)**
3325K	**nuclear quadrupole resonance (NQR)**
3330	**electron paramagnetic resonance and relaxatio**
3330B	**relaxation phenomena**
3330H	**chemically induced dynamic electronolarization (CIDEP)**
3335	**double resonances and other multiple esonances**
3335D	**DNMR, ENDOR, ELDOR, OVERHAUSER, INDOR, DNP**
3335H	**MODR and PMDR (microwave optical double resonance and phosphorescence microwave ouble resonance)**
3340	**Mossbauer spectra**
3345	**magneto-optical and electro-optical pectra; dichroism**
3345B	**Zeeman and Stark effects**
3345C	**magnetic circular dichroism**
3345D	**dichroism**
3350	**fluorescence, hosphorescence; radiationless transitions (intersystem crossing, nternal conversion)**
3350D	**fluorescence and phosphorescence spectra**
3350H	**radiationless transitions**
3365	**photoelectron spectra**
3365C	**NV and VUV photoelectron spectra**
3365F	**X-ray photoelectron spectra**
3370	**intensities and shapes of molecular pectral lines and bands**
3370C	**oscillator and band trengths, transition moments, Franck-Condon factors**
3370F	**lifetimes, absolute and relativeine and band intensities**
3370J	**line and band widths, shapes, and hifts**
3380	** hoton interactions with molecules(inc. Auger effect, birefringence, ompton effect, optical activity)**
3380B	**level crossing and optical pumping**
3380E	**autoionization, photoionization, andhotodetachment**
3380G	**diffuse spectra; predissociation, hotodissociation**
3380K	**multiphoton processes**
3380P	** Optical cooling of molecules; trapping**
3390	**other topics in molecularpectra and interactions with photons**
3400	**atomic and molecular collision rocesses and interactions**
3410	**general heories and models(inc. statistical theories, transition state, tochastic and trajectory models, etc)**
3420	**interatomic and ntermolecular potentials and forces(for molecular solids, see 3130N**
3420B	**general potential unctions and intermediate-range forces(3430 and 8220K potential nergy surfaces)**
3420F	**long-range forces**
3420K	**short-range forces**
3430	**potential energy surfaces for collisions(8220K - in chemical inetics, 3420 intermolecular forces, 3450L - in beam studies)**
3440	**elastic scattering of atoms and molecules**
3450	**inelastic scattering of atoms and olecules**
3450B	** Energy loss and stopping power (atoms and molecules)**

3450D   Interactions of atoms, molecules and ions with surfaces (see also 7920N Atom-, molecule-, and ion-surface impact and interactions)

3450E   rotational and vibrational energy transfer

3450H   electronic excitation and   onization (inc. beam-foil excitation and ionization)

3450L   chemical reactions, energy disposal, and angular istribution, as studied by atomic and molecular beams(3430 and 8220Kotential-energy surfaces, 8240D beam reactions)

3450R   Laser-modified inelastic scattering of atoms and molecules

3470   charge transfer(8230 charge transfer eactions)

3480   electron scattering, electron spectra

3480B   elastic scattering of electronsy atoms and molecules

3480D   atomic excitation and ionization bylectron impact

3480G   molecular excitation,   onization, and dissociation by electron impact

3480L   Electron-ion recombination and electron attachment (atoms and molecules)

3480Q   Laser-modified electron scattering (atoms and molecules)

3485   Positron scattering, positron spectra (atoms and molecules)

3485B   Elastic scattering of positrons by atoms and molecules

3485D   Atomic excitation and ionization by positron impact

3485G   Molecular excitation, ionization and dissociation by positron impact

3485L   Positron-ion recombination and positron attachment (atoms and molecules)

3485Q   Laser-modified positron scattering (atoms and molecules)

3490   other topics in atomic andolecular collision processes and interactions

3500   properties of atoms and   olecules; instruments and techniques

3510   atoms

3510B   atomic masses, mass spectra, abundances,   nd isotopes(inc. isotope separation;for mass spectrometry, see also 0775; for radioisotope separation see 2842H or 8255)

3510D   electric and magnetic moments, polarizabilit

3510F   fine- and hyperfine-structure constants

3510H   ionization potentials, electron affinities

3510W   weak interactions

3520   molecules(6155, 6160, and 6165 specific structures of   etals and alloys, of other inorganic materials, and of organic   aterials, respectively)

3520B   general molecular conformation andymmetry; stereochemistry

3520D   interatomic distances and angles

3520G   bond strengths, dissociation energies,   ydrogen bonding, etc

3520J   barrier   eights (internal rotation, inversion); rotational isomerism, onformational dynamics

3520M   electric and magnetic moment(and derivatives), polarizability, and magnetic susceptibility

3520P   rotation, vibration, and   ibration-rotation constants

3520S   hyperfine and fine-structure constants

3520V   ionization potentials, electron   ffinities, molecular core binding energy

3520W   weak interactions

3520X   mass spectra

3520Y   correlation times in molecular dynamics

3580   atomic and molecular measurements and   echniques

3580B   Time-resolved measurements and techniques (atoms and molecules)

3600   studies of special atoms and molecules

3610   exotic atoms and   olecules (containing mesons, muons, and other abnormal particles)

3610D   positronium, muonium,   uonic atoms and molecules

3610G   mesonic atoms and molecules,   yperonic atoms and molecules

3620   macromolecules and polymer molecules(for biological macromolecules, ee also 8715; for polymer reactions and polymerization, see 8235)

3620C   conformation (statistics and dynamics)

3620E   constitution (chains and sequences)

3620F   molecular weights

3620H	configuration (bonds, dimensions)
3620K	electronic structure and spectra
3640	atomic and molecular clusters
3640B	Geometrical structure of clusters
3640C	Spectra and electronic structure of clusters
3640J	Interactions of clusters (collisions and reactions)
3690	other special atoms and molecules
4000	classical areas of phenomenology(inc.pplications)
4100	lectricity and magnetism; fields and charged particles(0350 Maxwell heory' general mathematical aspects)
4110	classical electromagnetism
4110D	electrostatics, magnetostatics
4110F	steady-state electromagnetic fields; lectromagnetic induction
4110H	electromagnetic waves: theory
4170	particles in lectromagnetic fields: classical aspects(inc. synchrotron radiation
4180	particle eams and particle optics(0780 electron and ion microscopy; 0777 beamandling equipment)
4180D	electron beams and electron optics
4180G	ion beams and ion optics
4190	other topics in electricity and magnetism
4200	optics(for properties of gases and of liquids and solids,ee 5170 and 7800 respectively; for atmospheric optics, see 9265; forhysiology of the eye, see 8732)
4210	propagation and transmission in omogeneous media
4210D	wave-front and ray tracing
4210F	edge and boundary effects, refraction
4210H	diffraction and scattering from extended odies
4210J	interference
4210K	absorption
4210M	coherence
4210N	polarization
4210Q	propagation and ransmission in homogeneous and anisotropic media; birefringence
4215	Geometrical optics
4215D	Optical wave fronts and ray tracing
4215E	Optical system design
4220	propagation and transmission in nhomogeneous media
4220C	wave-front, ray tracing,nd beam spread in random turbulent media
4220E	coherence in random turbulent edia; scintillation
4220G	scattering from haze, fog, ust, etc(9265 atmospheric optics)
4225	Physical optics
4225B	Optical propagation, transmission and absorption
4225F	Optical diffraction and scattering
4225G	Edge and boundary effects; optical reflection and refraction
4225H	Optical interference and speckle (inc. moire fringes) moire and speckle interferometry, see also 0760L
4225J	Optical polarization
4225K	Optical coherence
4225L	Birefringence (physical optics) （birefringence in condensed matter, see 7820F）
4230	optical information, image formation and nalysis
4230D	theory
4230F	aberrations
4230H	resolution
4230K	Fourier transform optics
4230L	modulation and optical transfer functions
4230N	optical storage and retrieval
4230Q	optical communications(4280S optical ommunication devices)

4230S	pattern recognition
4230V	image processing and restoration
4240	holography(for acoustic holography, see 4363)
4240D	theory
4240E	Holographic optical elements; holographic gratings
4240F	image characteristics
4240H	photographic and recording problems
4240J	Computer-generated holography
4240K	holographic instrumentation and techniques
4240M	applications
4250	quantum optics
4250V	Mechanical effects of light (inc. Light radiation pressure) for optical cooling of atoms, see also 3280P; for optical cooling of molecules, see also 3380P)
4252	masers
4255	lasing processes
4255B	general theory of lasing action
4255D	co 2 LASERS
4255F	inert gas lasers
4255G	Excimer lasers
4255H	lasing action in other gas lasers
4255K	chemical lasers(8240Themiluminescence and chemical laser kinetics)
4255M	lasing action in liquids and rganic dyes
4255P	lasing action in semiconductors withunctions
4255Q	Laser-active defect centres in solids (inc. colour centres)
4255R	lasing action in ther solids(inc. solid raman lasers)
4255T	free electron lasers
4255V	High energy lasing processes (e.g. gamma and X-ray lasers)
4260	laser systems and laser beam application
4260B	design of specific laser systems
4260D	laser resonators and cavities
4260F	laser beam modulation
4260H	optical problems related toroperties and interactions of laser beams
4260K	optical problems related to pplications of laser beams
4262	Laser applications (laser spectroscopy, see 0765, for medical uses of lasers, see 8760F)
4262A	Laser materials processing (see also 8100 Materials science)
4262E	Metrological applications of lasers (inc. remote sensing)
4265	nonlinear optics
4265B	general theory
4265C	stimulatedaman, Brillouin and Rayleigh scattering; parametric oscillations andarmonic generation
4265F	phase conjugation
4265G	photon echoes, self-inducedransparency, optical saturation and related effects
4265J	beam trapping, self focusing, hermal blooming, and related effects
4265K	Optical harmonic generation, frequency conversion, parametric oscillation and amplification
4265M	Multiwave mixing
4265P	Optical bistability, multistability and switching (for optical logic, see also 4280V)
4265S	Optical solitons
4265T	Optical chaos and related effects (inc. optical spatio-temporal dynamics)
4270	optical materials
4270C	glass
4270D	Liquid crystals (optical materials) （for structure of liquid crystals, see 6130 ）
4270E	quartz
4270F	other optical materials
4270G	light-sensitive materials
4270J	Optical polymers and other organic optical materials (for liquid crystal polymers,

see 4270D)

4270Q   Photonic bandgap materials

4270Y   Other optical materials

4272   optical sources and standards(for pectroscopic light sources, see also 0765)

4278   optical lens and mirror systems(for microscopes, see 0760P; forhotographic instruments, see 0768; for astronomical telescopes, see 9555)

4278C   lens and mirror design

4278D   optical system design(4230 image   ormation)

4278F   performance and testing ofptical systems(4285 optical testing techniques)

4278H   coatings

4278M   eyepieces, projection systems, prism ystems

4280   opticalevices, techniques and applications(for optical instruments and echniques, see 0760; for optical spectroscopy, see 0765; for hotography, see 0768; for holography, see 4240; for lasers, see 4255nd 4260; for masers, see 4252)

4280A   Optical lenses and mirrors (optical microscopes, see 0760P; for photographic instruments, see 0768; for astronomical telescopes, see 9555C)

4280B   spatial filters, zone plates

4280C   spectral and other filters

4280D   monochromators

4280E   shutters, windows, diaphragms,   eflectors, choppers

4280F   gratings, echelles

4280G   prisms

4280H   beam splitters

4280J   collimators and autocollimators

4280K   optical beam modulators

4280L   optical waveguides(for fibre   ptical waveguides, see 4280M)

4280M   fibre optics

4280N   schlieren devices

4280P   rangefinders

4280Q   image detectors, convertors, and   ntensifiers

4280R   Gradient-index (GRIN) devices
(see also 4281H GRIN fibre devices and techniques) ,（for fibre optics, see 4281H ）

4280S   optical communications devices

4280T   Optical storage and retrieval (inc. optical discs)

4280V   Optical computers, logic elements, and interconnects (inc. optical neural nets)

4280W   Ultrafast optical techniques (see also 7847 Ultrafast optical measurements in condensed matter)

4280X   Optical coatings (inc. antireflection coatings and optical multilayers) （ solar control films, see 4280Y ）

4280Y   Solar collectors, concentrators and control films: optical aspects

4281   Fibre optics and fibre waveguides

4281B   Optical fibre fabrication, cladding, splicing, joining (see also 4285D Optical fabrication)

4281C   Optical fibre testing and measurement of fibre parameters (see also 4285F Optical testing techniques)

4281D   Optical propagation, dispersion and attenuation in fibres (inc. absorption, scattering and loss mechanisms)

4281F   Other fibre optical properties (inc. birefringence and polarization)

4281H   Gradient-index (GRIN) fibre devices and techniques (see also 4280R GRIN devices)

4281M   Fibre couplers and connectors

4281P   Fibre optic sensors; fibre gyros

4281W   Other fibre optical devices and techniques (for fibre lasers and amplifiers, see 4255N)

4282   integrated optics(for optical aveguides see also 4280L)

4283   Micro-optical devices and technology (inc. micro-optomechanical and micro-opto-electro-mechanical systems)

4285	optical testing and workshop techniques
4285D	surface grinding, fabrication
4285F	optical testing techniques
4290	other topics in optics
4300	coustics(for audition, see 8734; for speech, see 8736; for sound ffects on living matter, see 8750C)
4320	general linear coustics(0340K mathematical problems in waves and wave propagation)
4325	nonlinear acoustics and macrosonics(4360 acoustic signal rocessing; 4388 transduction; devices for generation and production f sound)
4328	aeroacoustics and atmospheric ound(9260 meteorology)
4330	underwater sound(9210 physics of the cean)
4335	ultrasonics, uantum acoustics, and physical effects of sound(for phonons in rystal lattices, see 6300; for plasma acoustics, see 5235; for low- emperature acoustics and sound in liquid helium, see 6700; for coustic properties of liquids, see 6260; for acoustical properties ofolids, see 6265; for ultrasonic relaxation, see 6280; for acoustic roperties of thin films, see 6860; for surface waves in solids, see 6825; for acoustoelectric effects and acoustic wave amplification, see 7250; for magnetoacoustic effects, oscillations and resonance, see 7255; for acousto-optical effects and acoustic holography, see 7820h nd 4363; for sound effects on living matter, see 8750)
4337	Acoustic emission (inc. Radiation acoustics)
4337D	Thermoacoustics
4337G	Photoacoustics (for photoacoustic effect in condensed matter, see also 7820H)
4340	echanical vibrations and shock(4630M vibrations, aeroelasticity, ydroelasticity, mechanical waves and shocks)
4345	statistical studies of acousticalesponse(4355 architectural acoustics)
4350	noise, its effects and contro(8670J environmental science)
4355	architectural acoustics
4360	acoustic signal processing
4363	acoustic holography
4370	speech ommunication(inc. speech perception, speech intelligibility, and peech synthesis;8736 speech)
4370C	Human speech communication
4370F	Machine-based speech communication
4375	music and musical instruments
4385	acoustical easurements and instrumentation(for acoustic noise measurement, see lso 4350; for photoacoustic spectroscopy, see 0765)
4385D	Measurement of acoustic variables
4385G	Measurement by acoustic techniques
4388	transduction; devices for the eneration and reproduction of sound
4390	other topics in acoustics
4400	heat flow, thermal and hermodynamic processes(for theory of transport processes and hermodynamics, see 0500; for heat transfer in flows, see 4725Q; for hermal and thermodynamic properties of condensed matter, see 6500)
4410	heat conduction (models, phenomenological escription)
4425	convection(4725Q convection and eat transfer in flows)
4430	heat transfer in inhomogeneous mediand through interfaces
4440	heat radiation
4450	thermal properties of atter (phenomenology)(0720 thermal instruments and techniques)
4460	thermodynamic rocesses (phenomenology)(0570 thermodynamics, 0720 thermal nstruments and techniques)
4490	other topics in heat flow, thermalnd thermodynamic processes
4600	mechanics, elasticity, rheology
4610	mechanics of discrete systems(032eneral mathematical aspects)
4620	continuum mechanics(0340 general athematical aspects)

4630	mechanics of solids (6220 mechanical properties of solids, as related to microscopic tructure)
4630C	elasticity
4630J	iscoelasticity, plasticity, viscoplasticity, creep, and stress elaxation(inc. rheology of solids)
4630L	buckling and instability
4630M	ibrations, aeroelasticity, hydroelasticity, mechanical waves, and hocks(4340 mechanical vibrations and shock)
4630N	fracture mechanics, fatigue and cracks
4630P	friction, wear, adherence, ardness, mechanical contacts
4630R	measurement ethods and techniques(0710 mechanical instruments and techniques; 8170 materials testing)
4660	rheology of luids and pastes(4750 non-newtonian dynamics; 6620 diffusive momentumransport)
4660B	viscoelasticity
4660D	nonlinearities
4660F	rheopexy, thixotropy
4660H	Electrorheological and magnetorheological fluids （ see also4765Magnetohydrodynamics and electrohydrodynamics, 8185 Intelligent materials）
4690	other topics in mechanics, lasticity, and rheology
4700	fluid dynamics(for fluid ynamics of quantum fluids, see 6700; for geophysical fluid dynamics,see 9210; for astrophysical gas dynamics, see 9530; for biological luid dynamics, see 8745)
4710	general theory(0340G mathematical spects)
4715	laminar flows(inc. Couette flow)
4715C	laminar boundary layers
4715F	stability of laminar flows
4720	hydrodynamic stability and instability
4725	turbulent flows, convection, and heat transfer
4725C	isotropic turbulence
4725F	boundary layer and shear turbulence
4725J	turbulent diffusion
4725M	noise (turbulence generated)
4725Q	convection and heat transfer(4425onvective and constrained heat transfer)
4725R	wakes
4730	rotational flow and vorticity
4735	waves
4740	ompressible flows; shock and detonation phenomena(2870 nuclear xplosions; 5235T plasma shock waves)
4740D	general subsonic flows
4740H	transonic flows
4740K	supersonic and hypersonic flows
4740N	shock-wave interactions
4745	rarefied gas dynamics(0730 acuum production and techniques)
4745D	free molecular flows
4745G	slip flows
4745N	accommodation
4750	non-newtonian dynamics
4752	Chaos and fractals in flow (inc. bifurcations)
4754	Pattern selection in flow
4755	nonhomogeneous flows
4755B	cavitation
4755C	jets
4755E	nozzles
4755H	stratified flows
4755K	multiphase flows(inc. phase transitions inlow)

4755M	**flow through porous media**
4760	**flowsn ducts, channels, and conduits(inc. Poiseuille and capillary flow; or biological fluid dynamics, see 8745)**
4762	**Flow control**
4765	**agnetohydrodynamics and electrohydrodynamics(for MHD in plasma, see**
4770	**reactive, radiative, or nonequilibrium lows**
4770F	**chemically reactive flows**
4770M	**radiation gas dynamics**
4775	**relativistic fluid dynamics**
4780	**instrumentation for fluid dynamics(inc. flow visualisation)**
4790	**other topics in fluid dynamics**
5000	**fluids, plasmas and electric discharges(for fluid dynamics, see 4700; for the physics of condensed matter, see 6000 and 7000)**
5100	**kinetic and transport theoryf fluids; physical properties of gases**
5110	**kinetic and transport theory**
5120	**viscosity and diffusion: experimental**
5130	**thermal properties of gases**
5140	**acoustical properties of gases; ultrasonic relaxatio(4335 ultrasonics; for acoustic properties of liquids, see 6260; for ltrasonic relaxation in liquids, see 6280)**
5150	**electrical phenomena in gase (5200 plasma and electric discharges)**
5160	**magnetic phenomena in gase (for liquids, see 7500)**
5170	**optical phenomena in gase (for liquids, see 7800)**
5190	**other topics in the physics of fluids**
5200	**the hysics of plasmas and electric discharges(for fusion reactors, see 2852; for solid-state plasma, see 7230)**
5220	**elementary processes in plasma**
5220D	**single-particle orbits**
5220F	**electron collisions**
5220H	**atomic, molecular, heavy-particle ollisions**
5225	**plasma basic properties**
5225D	**plasma kinetic equations**
5225F	**transport properties**
5225G	**fluctuation phenomena**
5225K	**thermodynamics of plasmas**
5225L	**temperature and density**
5225M	**dielectric properties**
5225P	**emission, absorption, and scattering of adiation**
5225V	**Impurities in plasma**
5225W	**Nonneutral plasmas**
5225Z	**Dusty plasmas and plasma crystals**
5230	**plasma flow; agnetohydrodynamics(4765 fluid dynamics)**
5235	**waves, oscillations, and nstabilities in plasma**
5235B	**magnetohydrodynamic waves**
5235D	**sound waves**
5235F	**electrostatic waves and oscillations**
5235H	**electromagnetic waves**
5235K	**drift waves**
5235M	**nonlinear waves and nonlinear nteractions**
5235P	**plasma instabilities**
5235R	**plasma turbulence**
5235S	**Plasma solitons**
5235T	**shock waves**
5240	**plasma interactions**
5240D	**electromagnetic wave propagation in lasma**
5240F	**antennas in plasma; plasma-filled waveuides**
5240H	**solid-plasma interactions**

5240K	sheaths
5240M	particle beam interactions in plasma(for laser beam ropagation, see 5240D; for laser beam production and heating of lasma, see 5250J)
5250	plasma production and heating
5250D	plasma sources(5280 electric discharges)
5250G	plasma heating
5250J	plasma production and heating by lasereams
5250L	plasma production and heating y shock wave and wire explosion
5255	plasma equilibrium and confinement
5255D	general theory
5255E	pinch effect and pinch machines
5255G	plasma in torus (stellarator, okamak, etc.)
5255K	magnetic traps (e.g.,stron, helitron, mirror, cusp, etc)
5255M	nonmagnetic onfinement systems (e.g. electrostatic, inertial and high frequency onfinement, etc.)
5255P	confinement in fusion reactors (2852 fusion reactors)
5260	relativistic plasma
5265	plasma simulation
5270	plasma diagnostic techniques and nstrumentation
5270D	electric and magnetic techniques, robes
5270G	radiofrequency and microwave techniques
5270K	optical techniques
5270L	X-ray and gamma-ray plasma diagnostic techniques
5270N	particle techniques
5275	plasma devices and applications(2852usion reactors, 8630L electrogasdynamic and magnetohydrodynamic onversion; for ion sources, see 2925 particle sources and targets)
5275D	accelerators and propulsion
5275F	magnetohydrodynamic generators and hermionic convertors
5275H	plasma torches
5275K	plasma switches
5275P	Plasma diodes
5275R	Plasma applications in manufacturing and materials processing (for plasma CVD, see also 8115H; for plasma arc spraying, see also 8115R)
5280	electric discharges(5150 electrical henomena in gases)
5280D	conductivity and discharge (low-field and Townsend)
5280H	glow and corona discharges
5280M	arcs and sparks
5280P	high-frequency discharges
5280Q	explosions
5280S	magnetoactive and Penning discharge
5280V	discharges in vacuum
5280W	discharges and electric breakdown in iquids
5280Y	Discharge methods for spectral sources
5290	other topics in plasma physics andlectric discharges
6000	condensed matter: structure, hermal and mechanical properties
6100	structure of iquids and solids; crystallography(6820 solid surface structure; 710lectron states)
6110	x-ray determination of structures(6180 radiation damage and ther irradiation effects;for specific determinations, see 6155 to 6180)
6110D	theories of diffraction and scattering
6110F	experimental techniques(inc. apparatus, techniques and alculation methods for analyzing experimental results:0785 x-ray, amma-ray instruments and techniques)
6110M	Crystal structure solution and refinement techniques using X-rays
6112	neutron determination of tructures(for specific determinations, see 6155 to 6180)
6112B	Theories of neutron diffraction and scattering

6112D	**elastic neutron diffraction and scatterin**
6112E	**Neutron scattering techniques (inc. small-angle scattering)**
6112F	**inelastic neutron diffraction and cattering**
6112G	**Neutron diffraction techniques (e.g. powder, single crystal, energy dispersive, and pulsed neutron source methods)**
6114	**electron determination oftructures(for specific determinations, see 6155 to 6180)**
6114D	**theories of diffraction and scattering**
6114F	**experimental diffraction and scattering**
6114H	**low-energy electron diffraction(LEED) and reflection high-energy electron diffraction (RHEEL)**
6114R	**Other electron diffraction and scattering techniques (e.g. electron impact desorption and spin-polarised electron techniques)**
6116	**other determinationf structures(for specific determinations, see 6155 to 6180)**
6116D	**electron microscopy determinations**
6116F	**field-ion microscopy determinations**
6116N	**EPR and NMR determinations**
6116P	**Scanning probe microscopy determinations of structures (inc. atomic force, magnetic force, and other scanning tunnelling microscopies)**
6120	**classical, semiclassical, and quantumheories of liquid structure(for kinetic and transport theory, see 5110; for electronic states, see 7100; for liquid helium, see 6700)**
6120G	**statistical theories of liquid structure**
6120J	**computer simulation of static and dynamic behaviour**
6120L	**time-dependent properties**
6120N	**structure of simple liquids**
6120Q	**structure of associated liquids**
6125	**studies of specific iquid structures(6140 amorphous and polymeric materials)**
6125B	**liquid noble gases**
6125E	**molecular liquids**
6125H	**macromolecularnd polymer solutions (solubility, swelling, etc.); polymer melts**
6125K	**molten salts**
6125M	**liquid metals**
6130	**liquid crystals(6470M transitions in liquid rystals)**
6130B	**molecular theories of liquid rystals(inc. statistical mechanical theories)**
6130C	**microstructure theory of iquid crystals (continuum, swarm theories)**
6130E	**experimental eterminations of smectic, nematic, cholesteric, and lyotropic tructures**
6130G	**orientational order of liquid crystals inlectric and magnetic fields**
6130J	**defects in liquid crystals**
6140	**morphous and polymeric materials(6470P glass transitions; 8120P to 8120T, and 8160 materials science)**
6140D	**glasses**
6140K	**polymers, elastomers, and plastics**
6140M	**Structure of quasicrystals**
6146	**Structure of solid clusters, nanoparticles, and nanostructured materials (for atomic and molecular clusters, see 3640; for fullerenes and carbon nanotubes, see 6148)**
6148	**Structure of fullerenes and fullerene-related materials (inc. carbon nanotubes)**
6150	**crystalline tate(inc. molecular motions in solids;for magnetic structure and spinystems, see 7525)**
6150C	**physics of crystal growth(for techniques of crystalrowth and film deposition, see 8110 and 8115; for epitaxy, thin ilms, see 6855; for whiskers, see 6870)**
6150E	**crystal symmetry; models and pace groups, and crystalline systems and classes**
6150J	**crystal morphology and orientation**
6150K	**crystallographic aspectsf polymorphic and order-disorder transformations**
6150L	**crystal binding**
6155	**specific structure of elements and alloys**

6155D	**nonmetallic elements**
6155F	**metallic elements**
6155H	**alloys**
6160	**specific structure of inorganic compounds**
6165	**specific structure of organic compounds**
6170	**efects in crystals(6180 radiation damage, 6200 mechanical and coustic properties, 7155 impurity and defect levels; 7630M EPR of olour centres and other defects; 7850 impurity and defect absorptionn solids; 8140 treatment of materials)**
6170B	**interstitials and vacancies(exc. colour entres)**
6170D	**colour centres**
6170E	**other point defects**
6170G	**dislocations: theory**
6170J	**etchits, decoration, transmission electron-microscopy and other direct bservations of dislocations**
6170L	**lip, creep, internal friction and other indirect evidence of islocations(6220H creep; 6240 internal friction)**
6170N	**grain and twin boundaries**
6170P	**stacking faults,tacking fault tetrahedra and other planar or extended defects**
6170Q	**Inclusions and voids (inc. bubbles)**
6170R	**crystal mpurities: general(7155 impurity and defect levels; 8110 purificationechniques)**
6170T	**doping and mplantation of impurities(6630J diffusion, migration, and isplacement of impurities)**
6170W	**impurity oncentration, distribution, and gradients(6630J diffusion, migrationnd displacement of impurities)**
6170Y	**interaction between different rystal structure defects**
6180	**radiation damage and other irradiation effects(for echniques of structure determination, see 6110 to 6116; for electro 2nd ion impact phenomena, see 7920)**
6180B	**laser beams**
6180C	**x-rays**
6180E	**gamma rays**
6180F	**electrons and positrons**
6180H	**neutrons**
6180J	**ions(for ion implantation, see 6170T)**
6180J	**Ion beam effects(for ion implantation, see 6170T)**
6180L	**atoms and molecules**
6180M	**hannelling, blocking and energy loss of particles(2970 energy loss nd range relations)**
6185	**Modelling and computer simulation of solid structure (inc. molecular dynamics studies)**
6190	**other topics in structure of liquids andolids**
6200	**mechanical and acoustic properties of ondensed matter(4630 mechanics of solids and rheology; 6170 defects n crystals; 6825 surfaces and interfaces; 8100 materials science;forhermomechanical effects; see 6570; for magnetomechanical effects, see 7580; for piezoelectric effects, see 7760; for elasto-optical effects,see 7820H)**
6210	**mechanical properties of iquids(for viscosity of liquids, see 6620)**
6220	**mechanical properties of solids (related to icroscopic structure)(8140 treatment of materials and its effects onicrostructures and properties, 8170 materials testing)**
6220D	**elastic constant (0340D mathematical theory of elasticity, 8140J elasticity and nelasticity)**
6220F	**eformation and plasticity(inc. yield, ductility and superplasticity 8140L deformation, plasticity and creep)**
6220H	**creep(8140L deformation, plasticitynd creep)**
6220M	**fatigue,rittleness, fracture and cracks(inc. hardness;8140N fatigue, mbrittlement and fracture)**

6220P	tribology(8140P friction, ubrication and wear)
6230	mechanical and elastic waves(0340Kathematical aspects)
6240	anelasticity, internal riction and damping(8140J elasticity and anelasticity)
6250	high-pressure and shock-wave effects inolids
6260	acoustic properties of liquids(6280 ultrasonic elaxation;for sound propagation, see 4300; for second sound in uantum fluids, see 6740, 6750 and 6760)
6265	acoustic roperties of solids(6280 ultrasonic relaxation;for sound propagation,ee 4300; for lattice dynamics and phonons, see 6300; for agnetoacoustic effects, see 7255; for acoustoelectric effects, see 7250; for acousto-optical effects, see 7820h)
6280	ultrasonic elaxation(7430G ultrasonic attenuation in superconductors; 4335 2ltrasonics)
6290	other topics in mechanical andcoustical properties of condensed matter
6300	lattice dynamics and crystal tatistics(0550 lattice theory, 6500;thermal properties, 6670 thermalonduction, 6830 dynamics of surface and interface vibrations, 7830 nfrared and raman spectra)
6310	general theory
6320	phonons and vibrations in crystal lattice
6320D	phonon states and bands, ormal modes, and phonon dispersion
6320H	phonon-phonon interactions
6320K	phonon-electron interactions
6320L	Phonon interactions with quasi-particles
6320M	phonon-defect interactions
6320P	localized modes
6320R	Anharmonic lattice modes
6322	Phonons in low-dimensional structures and small particles (inc. superlattices and quantum dots, wells and wires)
6350	vibrational states in disordered systems
6370	statistical echanics of lattice vibrations(6500 thermal properties of condensed atter; 6670 thermal conduction)
6375	statistical mechanics of isplacive phase-transitions(for order-disorder and statistical echanics of model systems, see 6460; for crystallographic aspects ofolymorphic and order-disorder transformations, see 6150K)
6390	other topics in lattice dynamicsnd crystal statistics
6400	equations of state, phasequilibria and phase transitions(8260 chemical thermodynamics)
6410	general theory of equations of state nd phase equilibria
6430	equations of state of specific ubstances(6570 thermal expansion)
6460	general studies of phase transitions(for ritical phenomena in quantum fluids, superconductors, magnetic aterials and ferroelectrics, see 6700, 7440, 7540 and 7780)
6460A	Renormalization group, fractal and percolation studies of phase transitions
6460C	order-disorder and statisticalechanics of model systems
6460F	equilibrium properties near ritical points, critical exponents
6460H	dynamic critical phenomena
6460K	multicritical points
6460M	metastable phases
6460Q	nucleation
6470	hase equilibria, phase transitions, and critical points(8130 phase iagrams and microstructures developed by solidification and solid- olid phase transformations)
6470D	solid-liquid transitions(8130F olidification)
6470F	liquid-vapour transitions
6470H	solid-vapour transitions
6470J	liquid-liquid transitions
6470K	solid-solid transitions(6150K rystallographic aspects of polymorphic and order-disorder 2ransformations; 8130H, 8130K, 8130M microstructures developed by olid-solid phase transformations)
6470M	transitions in liquid crystals

6470P	glass transitions
6470R	Commensurate-incommensurate transitions
6475	solubility, segregation, and mixing
6480	other phase properties of systems
6480E	stoichiometry and homogeneity
6480G	microstructure
6490	other topics in equations of tate, phase equilibria and phase transitions
6500	thermal properties of condensed matter(0570 thermodynamics, 6300 attice dynamics;for thermal conduction in nonmetallic liquids, see 6660; for thermal conduction in nonmetallic solids, see 6670; for lectronic thermal conduction, see 7215, 7220 and 7430E; for hermodynamic properties of quantum fluids, see 6740 6750, and 6760; or thermal properties of solid helium, see 6780)
6520	heat capacities of liquids
6540	heat capacitiesf solids(for specific heat of superconductors, see 7430E; for pecific heat of magnetic systems, see 7540)
6540E	lattice and electronic heat capacity
6540H	lambda and Schottky anomalies
6550	thermodynamic properties and entropy
6570	thermal expansion and hermomechanical effects(6430 equations of state;for electronic hermal conduction, see 7215 and 7220; for thermal conductivity of uperconductors, see 7430e; for pyroelectric and electrocaloric ffects, see 7770)
6590	other topics in thermal properties ofondensed matter
6600	(nonelectronic) transport properties ofondensed matter
6610	diffusion and ionic conduction in liquid
6610C	diffusion and thermal diffusion
6610E	ionic conduction(8245 electrochemistry)
6620	diffusive momentum transport (inc. viscosity of liquids)
6630	diffusion in solids
6630D	theory of diffusion and ionic onduction in solids
6630F	self-diffusion in metals, semimetals,nd alloys
6630H	self-diffusion and ionic conduction n nonmetals
6630J	diffusion, migration and displacement of mpurities
6630L	diffusion, migration, and displacementf other defects
6630N	chemical interdiffusion
6630Q	electromigration
6660	thermal onduction in nonmetallic liquids(for thermal conduction in liquid etals, see 7215C)
6670	nonelectronic thermal conduction and eat-pulse propagation in nonmetallic solids(for thermal conduction inolid metals, see 7215C and 7215E; for statistical mechanics of attice vibrations, see 6370)
6690	other topics in nonelectronic transportroperties
6700	quantum fluids nd solids; liquid and solid helium(0530 quantum statistical echanics)
6720	quantum effects on the structurend dynamics of nondegenerate fluids
6740	boson degeneracy and superfluidity of elium-4
6740B	phenomenology and two fluid models
6740D	quantum statistical theory; ground tate, elementary excitations
6740F	dynamics of relaxation phenomena
6740H	hydrodynamics in specificeometries, flow in narrow channels
6740K	thermodynamic properties
6740M	first sound
6740P	transport rocesses, second and other sounds, and thermal counterflow(for apitza resistance, see also 6830)
6740R	films and weak link transport
6740V	vortices and turbulence
6740X	impurities and other defects

6750	fermi fluids; liquid helium-3
6750D	normal phase
6750F	superfluid phase
6760	mixed systems; liquid helium 3-4 ixtures
6760D	HeI-3He
6760F	HeII-3He
6770	films(inc. physical adsorption)
6780	solid helium and related quantum crystals
6780C	lattice dynamics and sound propagation
6780G	thermal properties
6780J	magnetic properties and nuclear magnetic esonance
6780M	defects, impurities and diffusion
6790	other topics in uantum fluids and solids (e.g. neutron-star matter)
6800	surfaces and interfaces; thin films and hiskers(for impact phenomena, see 7900; for physics of crystal rowth, see 6150C; for corrosion, oxidation and surface treatments,see 8160)
6810	luid surfaces and interfaces with fluids(inc. surface tension, apillarity, wetting and related phenomena)
6810C	surface energy (surface ension, interface tension, angle of contact, etc)
6810E	interface elasticity, viscosity, and iscoelasticity
6810G	interface activity, spreading
6810J	kinetics (evaporation, adsorption, condensation, catalysis, etc)(8265 surface 3rocesses)
6815	liquid thin films
6817	Monolayers and Langmuir-Blodgett films（ adsorbed layers, see 6845; for magnetic properties of monolayers, see 7570A）
6820	solid surface structure
6822	Surface diffusion, segregation and interfacial compound formation
6825	mechanicalnd acoustical properties of solid surfaces and interfaces(for ribology, see 6220P and 8140P)
6830	dynamics of solid surfaces and interface ibrations
6840	surface energy of solids; thermodynamic roperties
6842	Surface phase transitions and critical phenomena
6845	solid-fluid interfacerocesses(8265 sorption and accommodation coefficients)
6845B	sorption equilibrium
6845D	evaporation and condensation; dsorption and desorption kinetics
6848	solid-solid interfaces(inc.icrystals;for grain boundaries, see 6170N)
6855	thin ilm growth, structure and epitaxy(for techniques of crystal growth nd film deposition, see 8110 and 8115)
6860	nonelectronic physical properties of thin ilms
6860	Physical properties of thin films (nonelectronic)
6870	whiskers and dendrites: rowth, structure, and nonelectronic properties
6890	other topics in the tructure and nonelectronic properties of surfaces and thin films
7000	condensed matter:lectronic structure, electrical, magnetic, and optical properties(8140R electrical and magnetic properties related to materials reatment, 8140T optical properties related to materials treatment)
7100	electron states(6300 attice dynamics, 7300 surfaces, interfaces, and thin films)
7110	general theories and computational technique
7110A	Fermi liquid theory and other phenomenological models of many electron systems (condensed matter)
7110C	Electron gas, Fermi gas (condensed matter) (inc. jellium)（for two-dimensional electron gas, see 7320D ）
7110F	Lattice fermion models (condensed matter) (inc. Hubbard model)
7110P	Fermions in reduced dimensions (condensed matter) (inc. anyons, composite fermions, Luttinger liquid, etc)
7115	Methods of electronic structure calculations (condensed matter)

7115A Ab initio calculations (condensed matter electronic structure)

7115B Plane wave calculations (condensed matter electronic structure) (inc. APW, OPW and Kronig-Penney model)

7115F Atomic- and molecular-orbital methods (condensed matter electronic structure) (inc. HF, KKR and tight-binding calculations, LMTO and valence bond method)

7115H Pseudopotential methods (condensed matter electronic structure)

7115J Self consistent field (SCF) calculations (condensed matter electronic structure)

7115M Density functional theory, local density approximation (condensed matter electronic structure)

7115P General mathematical techniques in electronic structure calculations (condensed matter) (inc. Green's function, matrix algebra, variational techniques)

7115Q Molecular dynamics calculations and other numerical simulations (condensed matter electronic structure) (inc. Monte Carlo and Car-Parinello methods)

7115R Relativistic calculations (condensed matter electronic structure)

7115T Other methods of electronic structure calculations (condensed matter) (inc. cluster approximation, CPA calculations, k.p calculations, recursion method and RPA calculations)

7120 lectronic density of states determinations(inc. energy states of iquid semiconductors; 6540E lattice and electronic heat capacity)

7120 Electronic density of states determinations (inc. energy states of liquid semiconductors) see also 6540E Lattice and electronic heat capacity)

7120A Mathematical and computational techniques for electronic density of states

7120C Electronic density of states of metals, semimetals, and alloys

7120F Electronic density of states of nonmetallic inorganics

7120H Electronic density of states of organic compounds, polymers, and complex systems

7125 nonlocalized single-particle electronic tates

7125C techniques ofand-structure calculation (general theory, applications of group heory, analytic continuation, etc.)

7125H easurement of fermi surface parameters(inc. DHVA, magnetoacoustic, osition annihilation, and cyclotron resonance studies, etc.)

7125J effective mass and g-factors

7125L electron energy states in liquid metals

7125M electron energy states in amorphousnd glassy solids

7125P band structure of crystalline metals

7125R band structure of crystalline elementalemiconductors

7125T band structure of crystalline emiconductor compounds and insulators

7125V Electronic structure of organic compounds and polymers

7125W Electronic structure of solid clusters and nanoparticles

7125X Electronic structure of fullerenes and fullerene-related materials; intercalation compounds (inc. carbon nanotubes)

7127 Strongly correlated electron systems

7128 Narrow-band systems, heavy-fermion metals; intermediate-valence solids (for magnetic aspects, see 7520H and 7530M)

7130 metal-insulator transitions

7135 excitons and related phenomena (inc. electron-hole drops)

7136 polaritons(inc. 3hoton-phonon and photon-magnon interactions)

7138 olarons and electron-phonon interactions(for phonon-electron nteractions in lattices, see also 6320k)

7145 collective effects

7145G exchange, orrelation, dielectric and magnetic functions, plasmons(6150L rystcal binding)

7145J FERMI-THOMAS model

7145L Charge-density-wave systems （see also 7530F Spin-density waves)

7145N calculations of total electronicinding energy(6150l crystal binding)

7150 localized ingle-particle electronic states(exc. impurities|for localisation inisordered structures, see 7155J)

7155 impurity and defect levels

7155D	**metals, semimetals, and alloys**
7155E	**Impurity and defect levels in elemental semiconductors**
7155F	**tetrahedrally bonded nonmetals**
7155F	**Impurity and defect levels in tetrahedrally bonded nonmetals (inc. Elemental, II-VI, and III-V semiconductors)**
7155G	**Impurity and defect levels in II-VI and III-V semiconductors**
7155H	**other nonmetals**
7155H	**Impurity and defect levels in other nonmetals （exc. elemental, II-VI and III-V semiconductors)**
7155J	**localization in disordered structures**
7165	**positron states(7870b positron nnihilation)**
7170	**level splitting and interactions(7510 magnetic phenomena,7530e exchange and superexchange interactions, 7320 electronic surfacetates)**
7170C	**crystal and ligand fields**
7170E	**spin-orbit coupling, zeeman,tark and strain splitting**
7170G	**exchange interactions**
7170J	**nuclear states and interactions**
7170M	**other bulk localised tates(inc. intermediate valency)(for surface states, see 7320)**
7190	**other topics in electron states**
7200	**electronic transport n condensed matter(for surfaces, interfaces, and thin films, see 7300)**
7210	**theory of electronic transport; scatteringechanisms**
7210B	**general formulation of transport theory**
7210D	**scattering byhonons, magnons, and other nonlocalized excitations(7145 collective ffects)**
7210F	**scattering byoint defects, dislocations, surfaces, and other imperfections(inc. ondo effect)**
7215	**electronic conduction in metals and alloy**
7215C	**electrical and thermalonduction in amorphous and liquid metals and alloys**
7215E	**electrical and thermal conductionn crystalline metals and alloys**
7215G	**galvanomagnetic and other agnetotransport effects**
7215H	**thermomagnetic effects**
7215J	**thermoelectric effects**
7215L	**relaxation times and mean free paths**
7215N	**collective modes, e.g. in one-imensional conductors**
7215Q	**scattering echanisms and Kondo effect(7520H local moments in dilute alloys)**
7215R	**Quantum localization (metals/alloys)**
7220	**conductivity henomena in semiconductors and insulators(for nonelectronic thermal onduction, see 6670)**
7220D	**general theory, scattering mechanisms**
7220F	**low-field transport and mobility; iezoresistance**
7220H	**high-field and nonlinear effects**
7220J	**charge carriers: generation, ecombination, lifetime, and trapping**
7220M	**galvanomagnetic and other agnetotransport effects**
7220N	**thermomagnetic effects**
7220P	**thermoelectric effects**
7230	**high-frequency effects; plasma effects**
7240	**photoconduction and hotovoltaic effects; photodielectric effects**
7250	**acoustoelectric effects**
7255	**magnetoacoustic effects**
7260	**mixed conductivity and conductivity ransitions**
7270	**noise processes and phenomena**
7280	**onductivity of specific semiconductors and insulators(8140R lectrical and magnetic properties related to materials treatment)**
7280C	**elemental semiconductors**
7280E	**III-V and II-VI semiconductors**

7280G	transition-metal compounds
7280J	other crystalline inorganic semiconductors
7280L	organic semiconductors
7280N	amorphous and glassy semiconductors
7280P	liquid semiconductors
7280R	Electrical conductivity of fullerenes and related materials
7280S	Electrical conductivity of insulators
7280T	Electrical conductivity of composite materials
7290	other topics in electronic transportn condensed matter
7300	electronic structure and lectrical properties of surfaces, interfaces, and thin films
7320	electronic surface states(for mission and impact phenomena, see 7900)
7320A	Surface states, band structure, electron density of states
7320C	ideal surfaces
7320D	Electron states in low-dimensional structures (inc. quantum dots, wells and wires, superlattices, layer structures, and two-dimensional electron gas)（for electronic structure of intercalation compounds, see 7125X）
7320F	Weak localization (surface states) (e.g., quantized states)
7320H	impurity and imperfection levels
7320H	Surface impurity and defect levels; energy levels of adsorbed species
7320J	Delocalization processes (surface states)
7320M	Collective excitations (surface states) (inc. surface plasmons and other charge-density excitations)（see also 7145 Collective effects)
7325	surface conductivity
7325	Surface conductivity and carrier phenomena
7330	surface double layers, SCHOTTKY arriers, and work functions
7335	Mesoscopic systems and quantum interference （see also 7320 Electronic surface states,7340 Electrical properties of interfaces ）
7335C	Coulomb blockade; quantum tunnelling (inc. resonant tunnelling and single-electron tunnelling)
7340	interfaces
7340B	static electrification
7340C	contact resistance, contact potential,nd work functions
7340E	rectification
7340G	tunnelling: eneral(7450 in superconductors)
7340H	Quantum Hall effect
7340J	metal-to-metal contacts
7340L	Semiconductor-to- semiconductor contacts, P-N junctions, and heterojunctions
7340M	Semiconductor-electrolyte contacts
7340N	Metal-nonmetal contacts
7340Q	Metal-insulator- semiconductor structures(inc. Semiconductor-to-insulator)
7340R	Metal-insulator-metal structures
7340S	Metal-semiconductor-metal structures
7340T	Semiconductor-insulator-semiconductor tructures
7340V	Semiconductor-metal-semiconductor tructures
7360	Electronic properties of thin films
7360D	Metallic thin films
7360F	Semiconductor films
7360H	insulating thin films
7360J	Electrical properties of elemental semiconductors (thin films/low-dimensional structures)
7360K	superconducting films
7360L	Electrical properties of II-VI and III-V semiconductors (thin films/low-dimensional structures)
7360N	Electrical properties of amorphous and glassy semiconductors (thin films/low-dimensional structures)

7360P   Electrical properties of other inorganic semiconductors (thin films/low-dimensional structures) (exc. elemental, II-VI, III-V and amorphous semiconductors, and fullerenes)

7360R   Electrical properties of organic compounds and polymers (thin films/low-dimensional structures) (inc. organic semiconductors)

7360T   Electrical properties of fullerenes and related materials (thin films/low-dimensional structures)

7390   other topics in electricalroperties of surfaces, interfaces, and thin films

7400   superconductivity

7410   occurrence, critical temperature

7420   theory

7420D   phenomenological and two-fluid theories

7420F   BCS theory and its applications

7420M   Other theories of superconductivity (inc. Hubbard model, t-J model, and unconventional mechanisms of superconductivity)

7430   general properties

7430C   magnetization curves, Meissner ffect, penetration depth

7430E   thermodynamic properties; thermal conductivit

7430F   Transport properties of superconductors (inc. electrical and thermal conductivity, thermoelectric effects)

7430G   response to electromagnetic fields,uclear magnetic resonance, ultrasonic attenuation

7430H   Phase diagrams of superconductors

7430J   Electronic structure of superconductors

7430K   Phonons in superconductors

7430L   Mechanical and acoustic properties of superconductors (inc. elasticity, ultrasonic attenuation)

7430M   Optical properties of superconductors

7440   fluctuations and critical effects

7450   proximity effects, tunnelling henomena, and Josephson effect

7455   type-I superconductivity

7460   type-II superconductivity

7460E   mixed state, Hc 2, SURFACE SHEATH

7460G   flux pinning; fluxon-defect nteractions

7460J   critical currents

7460M   Material effects on Tc, K, critical currents in type-II superconductors (inc. impurities, ion implantation)

7465   Insulator-superconductor transition

7470   superconducting materials

7470B   Elemental superconductors

7470C   Superconducting A15 compounds and alloys

7470D   materialffects on T c, K, critical currents(8140R electrical properties elated to materials treatment)

7470E   Superconducting interstitial compounds and alloys (inc. carbides, nitrides)

7470F   Chevrel phase (ternary molybdenum chalcogenide) superconductors

7470G   type-I superconductors (non transitionetals)

7470H   Magnetic superconductors (inc. reentrant (ferromagnetic) and antiferromagnetic superconductors)

7470J   Superconducting layer structures and intercalation compounds

7470K   Organic superconductors

7470L   type-II superconductors (transition metals, alloys and compounds)

7470M   Amorphous, highly disordered, and granular superconductors

7470N   dirty superconductors

7470P   materials for high-field applications

7470Q   Laves phase (C15) superconductors

7470R   other superconducting materials

7470S   Superconducting metastable nonstoichiometric phases

7470T	Heavy-fermion superconductors
7470V	Perovskite phase superconductors (inc. high-temperature superconductors)
7470W	Fullerene superconductors
7470Y	Other superconducting materials
7475	Superconducting films
7490	other topics in superconductivity
7500	magnetic properties and materials(8140R agnetic properties related to materials treatment for galvanomagneticffects, see 7215G and 7220M; for magneto-optical effects, see 7820L
7510	general theory and models of magnetic ordering (0550 ISING problems, 7125 nonlocalized single-particle electronic tates, 7170 level splitting and interactions)
7510D	crystal-field theory and spin HAMILTONINS
7510H	ISING and other classical spin model
7510J	Heisenberg and other uantized localized spin models
7510L	band and itinerant models
7510N	Spin-glass models (magnetism)
7520	diamagnetism and paramagnetism
7520C	nonmetals
7520E	metals and alloys
7520H	local moment in ilute alloys; Kondo effect(7215Q electronic conduction)
7525	spin arrangements in agnetically ordered materials (neutron studies, etc)
7525	Spin arrangements in magnetically ordered materials (inc. neutron and spin-polarised electron studies, synchrotron-source X-ray scattering, etc)
7530	magnetically ordered aterials, other intrinsic properties(for critical point effects, see 7540)
7530C	saturation moments and magnetic susceptibilit
7530D	spin waves(7650 spin wave resonance)
7530E	exchange and uperexchange interactions(7170 level splitting and interactions)
7530F	Spin-density waves in magnetically ordered materials (see also 7145L Charge-density-wave systems)
7530G	anisotropy
7530H	magnetic impurity interactions
7530K	magnetic phase boundaries(inc. agnetic transitions, metamagnetism, etc)
7530M	Valence fluctuations, Kondo lattice and heavy fermions in magnetically ordered materials （for electron states, see 7128）
7530S	magnetocaloric effect
7530T	Surface magnetism
7530V	Enhanced magnetoresistance in bulk magnetic materials (inc. colossal magnetoresistance) （ see also7215G,7220MGalvanomagnetic and other magnetotransport properties ； for enhanced magnetoresistance in films and multilayers, see 7570P)
7540	critical-point effects, pecific heats, short-range order(inc. spin glasses)
7540B	general theory
7540C	Static properties of magnetic materials (inc. order parameter, static susceptibility, heat capacities, critical exponents)
7540D	Ising and other classical spin model
7540F	Heisenberg and other quantized pin models
7540G	Dynamic properties of magnetic materials (inc. dynamic susceptibility, spin waves, spin diffusion, dynamic scaling)
7540M	Numerical simulation studies of magnetic materials
7550	studies of pecific magnetic materials(8140r magnetic properties related to aterials treatment)
7550B	ferromagnetism of fe and its alloys
7550C	ferromagnetism of other metals
7550D	ferromagnetism of nonmetals
7550E	antiferromagnetics
7550G	ferrimagnetics

7550K	amorphous magnetic materials
7550L	Spin glasses (magnetic materials)
7550M	magnetic liquids
7550P	Magnetic semiconductors
7550R	Magnetism in interface structures (inc. layer and superlattice structures)
7550S	Magnetic recording materials
7550V	High coercivity magnetic materials (inc. permanent magnet materials)
7560	domain effects, magnetization curves, andysteresis
7560C	domain walls and domain structur (for magnetic bubbles, see 7570k)
7560E	magnetization curves, ysteresis, Barkhausen and related effects
7560G	high coercivity materials
7560J	fine-particle systems
7560L	magnetic aftereffects
7560N	magnetic annealing and temperature- ysteresis effects
7570	magnetic films and plates
7570A	Magnetic properties of monolayers and overlayers
7570C	Interfacial magnetic properties (inc. magnetic multilayers, quantum wells, superlattices, and heterostructures) （see also 7550R Magnetism in interface structures ）
7570D	properties in uniform state
7570F	Magnetic ordering in multilayers
7570K	domain structure (magnetic bubbles)
7570K	Domain structure in magnetic films (magnetic bubbles)
7570P	Enhanced magnetoresistance in magnetic films and multilayers (inc. giant magnetoresistance and spin valves) （see also 7215G, 7220M Galvanomagnetic and other magnetotransport effects）
7580	magnetomechanical and agnetoelectric effects, magnetostriction
7590	other topics in magnetic propertiesnd materials
7600	magnetic 3esonances and relaxation in condensed matter; Mossbauer effect(for easurement techniques, see 0758)
7620	general theory of resonances and relaxatio
7630	electron paramagnetic resonance and relaxatio
7630D	ions and impurities: general
7630F	iron group (3d) ions and impurities (Ti-Cu)
7630H	platinum and alladium group (4d and 5d) ions and impurities (Zr-Ag and Hf-Au)
7630K	rare-earth ions and impurities
7630L	other ions and impurities(for olour centres, see 7630M)
7630M	colour centres and other defects
7630P	conduction electrons
7630R	free radicals
7640	diamagnetic and cyclotron resonances
7650	ferromagnetic, ntiferromagnetic, and ferrimagnetic resonances; spin wave resonance(7530D spin waves)
7660	nuclear magnetic resonance and relaxation
7660C	chemical and knight shifts
7660E	relaxation effects
7660G	quadrupole resonance
7660J	effects of internal magnetic fields
7660L	spin echoes
7670	magnetic double resonances and cross effects
7670D	electron-nuclear double resonance (ENDOR)
7670E	dynamical nuclear polarization
7670F	double nuclear magnetic resonance (DNMR)
7670H	optical double magnetic resonance (ODMR)
7670K	electron double resonance (ELDOR)
7675	Muon spin rotation and relaxation in condensed matter
7680	Mossbauer effect; other gamma-ray pectroscopy

7690	other topics in magneticesonances and relaxation(inc. muon probe studies)
7700	dielectric properties and aterials(for conductivity phenomena, see 7220 and 7280)
7720	permittivity
7730	polarization and depolarization effects
7740	dielectric loss and relaxation
7750	dielectric breakdown and space-charge ffects
7755	dielectric thin films
7760	piezoelectricity and lectrostriction(for piezo-optical effects, see 7820H)
7770	pyroelectric and electrocaloric effects
7780	ferroelectricity and antiferroelectricity
7780B	transitions and Curie point
7780D	domain structure and effects; ysteresis
7780F	Ferroelectric switching phenomena
7785	electrical resonances
7790	other topics in dielectric properties nd materials
7800	optical properties and condensed matter spectroscopy and ther interactions of matter with particles and radiation(for phonon pectra, see 6300)
7820	optical properties and materials(8140T optical roperties related to materials treatment;for masers, and lasers see 4252 and 4255 respectively)
7820B	general theory (for pure homogeneous aterials)
7820D	optical constants and parameters
7820E	optical rotatory power
7820F	birefringence(inc. stress irefringence, flow birefringence, etc)
7820H	piezo-, elasto- and acousto-opticalffects
7820J	electro-optical effects
7820L	magneto-optical effects
7820N	thermo-optical effects
7820P	Photonic band gap (condensed matter) see also 4270Q
7820W	Other optical properties of condensed matter (inc. photorefractive effect)
7830	infrared and raman spectra and cattering
7830	Infrared and Raman spectra and scattering (condensed matter)(for stimulated Raman scattering, see also 4265C)
7830C	infrared and Raman spectra in liquids
7830E	infrared and Raman spectra in metals
7830G	infrared and raman spectra in norganic crystals
7830J	infrared and Raman spectra in organicrystals
7830L	Infrared and Raman spectra in disordered solids
7835	Brillouin and Rayleigh scattering
7840	visible and ultraviolet spectra
7840D	liquids
7840E	Visible and ultraviolet spectra of elemental semiconductors
7840F	tetrahedrally bonded nonmetals
7840G	Visible and ultraviolet spectra of II-VI and III-V semiconductors
7840H	other nonmetals
7840K	metals, semimetals, and alloys
7845	stimulated emission(4265Cn nonlinear optics)
7847	Ultrafast optical measurements in condensed matter (inc. time-resolved optical spectroscopies) （see also 4280W Ultrafast optical techniques)
7850	impurity and defect absorption in solids
7850E	insulators
7850G	semiconductors
7850J	metals, semimetals, and alloys
7855	photoluminescence
7855B	liquids
7855C	Photoluminescence in elemental semiconductors
7855D	tetrahedrally bonded nonmetals
7855E	Photoluminescence in II-VI and III-V semiconductors

7855F	alkali halides
7855H	other inorganic materials
7855K	organic materials
7860	other luminescence spectra and radiative recombination(for hotoconduction and photovoltaic effects, see 7240; for hotoluminescence, see 7855)
7860F	electroluminescence
7860H	cathodoluminescence, ionoluminescence
7860K	thermoluminescence
7860M	sonoluminescence, triboluminescence
7860P	chemiluminescence(8240T chemiluminescence and chemical laser kinetics)
7865	optical properties of thin films
7865E	metals
7865H	Optical properties of elemental semiconductors (thin films/low-dimensional structures)
7865J	nonmetals
7865K	Optical properties of II-VI and II-VI semiconductors (thin films/low-dimensional structures)
7865M	Optical properties of amorphous and glassy semiconductors and insulators (thin films/low-dimensional structures)
7865P	Optical properties of other inorganic semiconductors and insulators (thin films/low-dimensional structures) （ exc. elemental, II-VI and III-V semiconductors, amorphous semiconductors and insulators, and fullerenes)
7865T	Optical properties of organic compounds and polymers (thin films/low-dimensional structures) (inc. organic semiconductors)
7865V	Optical properties of fullerenes and related materials (thin films/low-dimensional structures)
7870	other interactions of matter witharticles and radiation
7870B	positron annihilation(7165 positron tates)
7870C	x-ray scattering
7870D	x-ray absorption and absorption edges
7870E	x-ray emission threshold and fluorescence
7870F	Channelling radiation see also 6180M Channelling, blocking and energy loss of particles)
7870G	microwave and radiofrequency nteractions(exc. resonances)
7890	otheropics in optical properties of condensed matter and other nteractions of matter with particles and radiation
7900	electron and ion emissiony liquids and solids; impact phenomena
7920	impact phenomena(inc. electron spectrand sputtering)
7920D	laser-light impact phenomena
7920F	electron impact: auger emission
7920H	electron impact: secondary emission
7920K	other electron impact phenomena
7920N	atom, molecule, and ion impact
7920R	atomic and molecular beam interactions
7940	thermionic emission
7960	photoemission and photoelectron spectra
7960C	clean metals
7960E	semiconductors and insulators
7960G	composite surfaces
7970	field emission and field ionization
7975	exoelectron emission
7980	resonance tunnelling
7990	other topics in emission and mpact phenomena in condensed matter
8000	cross-disciplinary physics and elated areas of science and technology
8100	materials science
8110	ethods of crystal growth and purification(for physics of crystal rowth, see 6150C; for epitaxial growth methods, see 6855)

8110B	growth from vapour
8110D	growth from solutions
8110F	growth from melts
8110H	zone melting and zone refining
8110J	growth from solid phases(inc. ultiphase diffusion and recrystallisation)
8115	methods of thinilm deposition(inc. epitaxial growth methods,6855 thin film growth, tructure, and epitaxy)
8115C	deposition by cathodic sputtering
8115G	vacuum deposition
8115H	chemical vapour deposition
8115I	Pulsed laser deposition
8115J	ion plating and other vapour deposition
8115L	deposition from liquid phases (melts and olutions)
8115N	Thin film growth from solid phases (inc. solid phase epitaxy)
8115R	Spray coating techniques
8120	other methods of preparation of materials
8120C	vacuum methods
8120E	powder techniques, compaction and sinterin
8120G	specific metals and alloys (compacts, pseudoalloys)
8120J	dispersion-,fibre-, and latelet-reinforced metal-based composites
8120L	ceramics and refractories
8120N	cermets, ceramic and refractory 3omposites
8120P	glasses
8120Q	glass-based composites, vitroceramics
8120S	polymers
8120T	reinforced polymers and polymer- ased composites
8120V	Preparation of fullerenes and fullerene-related materials, intercalation compounds, and diamond (inc. graphite)
8130	phase diagrams and microstructures developed by olidification and solid-solid phase transformations(6100 structure ofiquids and solids; 6470 phase equilibria, phase transitions, and ritical points)
8130B	phase diagrams of metals and alloys
8130D	phase diagrams of other materials
8130F	solidification(6470D solid-liquid ransitions)
8130H	constant-composition solid-solid phase transformations' olymorphic, massive, and order-disorder(6470K solid-solid ransitions)
8130K	martensitic transformations(6470K olid-solid transitions)
8130M	precipitation(inc. egregation;6475 solubility, segregation and mixing)
8140	treatment of materials and itsffects on microstructures and properties
8140C	solid solution hardening, recipitation hardening, dispersion hardening
8140E	cold working, workardening; post-deformation annealing, recovery and recrystallisation;extures
8140G	other heat and hermomechanical treatments(inc. other annealing types)
8140J	Elasticitynd anelasticity(6220D elastic constants, 6240 anelasticity, internalriction, and mechanical resonances)
8140L	deformation, lasticity and creep(6220F deformation and plasticity, 6220H creep)
8140N	fatigue,mbrittlement, and fracture(inc. hardness; 6220M fatigue, brittleness,racture and cracks)
8140P	friction, lubrication, and wear (6220P tribology)
8140R	electrical and magnetic properties elated to treatment conditions(7280 conductivity of specific emiconductors and insulators, 7470 superconducting materials, 7550 tudies of specific magnetic materials)
8140T	optical roperties related to treatment conditions(7820 optical properties andaterials)
8160	corrosion, oxidation and surface treatment
8160B	metals and alloys(inc. tress corrosion cracking; anticorrosion)
8160C	semiconductors

8160D	ceramics and refractories
8160F	glasses
8160H	composites
8160J	polymers
8170	materials testing(inc. sample preparation for examination, etallographic techniques;for measurement in the mechanics of solids,see 4630R)
8170C	nondestructive testing
8170E	Nondestructive testing: eddy current testing and related techniques
8170G	Nondestructive testing: optical methods (inc. infrared imaging, optical interferometry and holography)
8170J	Nondestructive testing: X-ray methods (inc. radiography and computerised tomography)
8170L	Nondestructive testing: other techniques (inc. microwave imaging, MRI and neutron radiography)
8180	reduced gravity xperiments(8765 aerospace biophysics and medical physics)
8185	Intelligent materials (inc. smart materials) （see also 4660H Electrorheological and magnetorheological fluids ）
8190	other topics in materials science
8200	physical chemistry
8220	chemical kinetics
8220D	statistical theories(inc. transition state
8220F	stochastic and trajectory odels, other theories and models
8220H	mechanisms and product distribution
8220K	potential energy surfaces for chemical reactions(3420 ntermolecular forces, 3430 potential energy surfaces for collisions 3450L atomic and molecular beam studies)
8220M	nonequilibrium kinetics(inc. fluctuation phenomena and kinetics f oscillating reactions (Belousov-Zhabotinskii, etc.))
8220P	measurements of rate onstants, reaction cross sections, and activation energies
8220R	energy distribution and transfer, relaxatio
8220T	kinetic andsotope effects(for isotope effects on electronic structure, see als 3130G)
8220W	computational modelling
8230	specific chemical reactions; reaction echanisms
8230C	atom and adical reactions (with themselves or with molecules)
8230E	molecule-molecule reactions
8230F	ion-molecule,on-ion, and charge-transfer reactions(3470 charge transfer)
8230H	chemical xchanges (substitution, atom transfer, abstraction, isproportionation, and group exchange)
8230L	decomposition reactions (pyrolysis, dissociation, and group ejection)
8230N	association, addition, and insertion
8230Q	isomerization and rearrangement
8230S	chain reactions
8230V	homogeneous catalysis(8265J eterogeneous catalysis at surfaces)
8235	polymer reactions and polymerization
8240	chemical kinetics and reactions;specialegimes
8240D	atomic nd molecular beam reactions(3450L chemical reactions as studied by tomic and molecular beams)
8240F	shock waves
8240J	fast and ultrafast reactions
8240M	impulse techniques
8240P	flames, combustion, and explosions
8240Q	electric discharges(inc. flowing 4fterglow)
8240T	hemiluminescence and chemical laser kinetics(4255K chemical lasers,7860P chemiluminescence)
8240W	chemistry of the pper atmosphere(9410 atmospheric composition, chemical

reactions androcesses)

8245	electrochemistry nd electrophoresis(6610 ionic conduction in liquids;for electro-smosis, see 8265)
8250	hotochemistry and radiation chemistry(inc. chemistry of photographicrocess,3350 fluorescence, phosphorescence; radiationless transitions
8250C	quantum yields
8250E	photodissociation, hotoionization as studied by luminescence and radiationless ransitions
8250F	Photolysis and photodissociation by IR, UV and visible radiation
8250G	Radiolysis and dissociation by X-rays and gamma-rays
8250J	energy deposition
8250L	ion-pair yields
8250R	g values
8255	radiochemistry
8255D	hot atom reactions
8255G	positronium chemistry
8255K	tracer reactions
8260	chemical thermodynamics(0570 hermodynamics)
8260C	enthalpies of combustion, reaction and ormation
8260F	heat capacity and heats of phase transitions
8260H	chemical equilibria and equilibrium constant
8260L	thermodynamics of solutions
8260N	nucleation
8265	surface processes
8265D	thermodynamics of surfaces
8265F	film and membrane rocesses; ion exchange; dialysis; osmosis, electro-osmosis
8265J	eterogeneous catalysis at surfaces and other surface reactions(8230Vomogeneous catalysis 6810J kinetics)
8265M	sorption and accommodation oefficients(6810J kinetics)
8265N	other gas-surface interactions
8270	disperse systems(for flow behaviour,see 4755K)
8270D	colloids
8270G	gels and sols
8270K	emulsions and suspensions
8270R	aerosols and foams
8280	chemical analysis and related physicalethods of analysis
8280B	chromatography(inc. paper, column, thin film, vapour phase, andon exchange chromatography)
8280D	electromagneticadiation spectrometry(inc. optical, X-ray, and magnetic resonance ethods)
8280F	electrochemical methods
8280H	radiochemical activation analysis methods
8280K	Energy conversion spectroscopic methods of chemical analysis (inc. optogalvanic, photoacoustic and photothermal spectroscopic methods)
8280M	mass spectrometry(0775 masspectrometers and spectrometry techniques)
8280P	photoelectron and Auger spectroscopy
8280S	methods using colligative properties
8280T	Chemical sensors (inc. gas sensors)
8290	other topics in physical chemistry
8600	energy research and environmental science
8610	energy esources and their utilisation(inc. economic aspects;for nuclear ngineering and nuclear power studies, see 2800)
8610B	ossil and other fuels(inc. biomass, synthetic, oil shale, pulveriseduels and hydrogen)
8610D	wind energy
8610F	tidal and flow energy(inc. water-wavenergy)
8610H	geothermal energy

8610K	**solar energy(inc. solar oncentrators and space heating applications)**
8610N	**nuclear energy(inc. nuclear process heat)**
8610Z	**other topics(inc. Industrial heat ecovery)**
8630	**energy conversion**
8630D	**electrochemical onversion: general(for superionic conductors, see 6630h)**
8630E	**primary cells**
8630F	**secondary cells**
8630G	**fuel cells**
8630J	**photoelectric conversion, solar ells and arrays**
8630K	**photoelectrochemical conversion**
8630L	**lectrogasdynamic and magnetohydrodynamic conversion(5275 plasma evices and applications)**
8630M	**thermoelectric conversion**
8630N	**thermionic conversion**
8630P	**hotosynthesis(inc. bioenergy and biomass conversion;8725 cellular iophysics)**
8630Q	**hemical energy conversion(inc. coal gasification;for electrochemicalonversion, see 8630D; for photoelectrochemical conversion, see 8630K**
8630R	**thermal energy conversion (heat engines andeat pumps)**
8630S	**hotothermal conversion(inc. solar absorbers and solar ponds, space eating, refrigerators and stills)**
8630Z	**other topics**
8640	**energy storage (secondary energy)**
8640C	**storage in mechanical energy(inc. ompressed air storage)**
8640F	**storage in thermal energy(inc. solaronds and tanks)**
8640H	**storage in chemical energy**
8640K	**hydrogen storage and technology**
8640Z	**other topics**
8660	**requirement for energy: ecological aspects**
8670	**environmental science(8760R radioactive pollution;forceanographic aspects, see 9210; for hydrological aspects see 9240; or meteorological aspects see 9260)**
8670C	**soil**
8670E	**water**
8670G	**atmosphere**
8670J	**noise(4350 noise, its effects andontrol)**
8670L	**measurement techniques in environmental cience**
8670Z	**other topics**
8690	**other topics in energy research nd environmental science**
8700	**biophysics, medical physics,nd biomedical engineering**
8710	**general,heoretical, and mathematical biophysics(inc. logic of biosystems, uantum biology, and relevant aspects of thermodynamics, information heory, cybernetics, and bionics)**
8715	**molecular biophysics(362acromolecules and polymer molecules)**
8715B	**structure,onfiguration, conformation, and active sites at the biomolecular evel**
8715D	**physical chemistry of solutions; condensedtates**
8715H	**molecular dynamics, molecularrobes, molecular pattern recognition**
8715K	**molecular interactions, charge ransfer complexes**
8715M	** nteractions with radiations at the biomolecular level(inc. uminescence, epr and nmr)**
8715P	**model reactions**
8716	**biothermics**
8720	**membrane biophysics**
8720C	**general theory of interfaces(inc. ractical models)**
8720E	**natural and artificial membranes(inc.mmobilized enzymes)**
8725	**cellular biophysics**
8725B	**bioenergetics(inc. photosynthesis)**
8725D	**biological transport; ellular and subcellular transmembrane physics**
8725F	**physics of subcellular structures**

8728	Bioelectricity
8730	biophysics of europhysiological processes(exc. perception processes and speech)
8730C	electrical activity for xcitable and nonexcitable biosystems
8730E	external and internal data communications, nerve conduction and ynaptic transmission(inc. neuromuscular transmission and muscular ontraction)
8730G	memory storage and emorization (biophysical and biochemical processes)
8732	physiological optics, vision
8732C	anatomy and optics of the eye
8732E	physiology of the eye; nerve structurend function
8732J	eye modulation transfer
8732L	light detection; adaptation and discriminatio
8732N	colour detection; adaptation and iscrimination
8732Q	scales for light and colour detection
8732S	psychophysics of vision, isual perception, binocular vision
8734	audition
8736	speech(4370 speech communication)
8738	mechano- and hemio-ceptions(inc. biosonic generation, detection and guidance)
8740	biomagnetism(inc. magnetocardiography)
8745	biomechanics, biorheology, iological fluid dynamics
8745B	mechanical properties of tissues and organ
8745D	physics of body movements
8745F	rheology of body fluids
8745H	haemodynamics, pneumodynamics
8750	biological effects of radiations(inc. ffects of fields)
8750B	interactions of biosystems with adiations
8750C	bioacoustics (sonic and ltrasonic effects on living matter)
8750E	bio-optics (effects f microwaves, light, laser and other electromagnetic waves)
8750G	ionizing radiations (UV, X-ray, gamma-ray; particle radiation effects)
8760	edical and biomedical uses of fields, radiations, and radioactivity(2880 nuclear radiation technology, including shielding)
8760B	sonic and ultrasonic radiation
8760D	electric and magnetic fields (dc andulsed)
8760F	Optical and laser radiation (medical uses) (inc. fibre optics, infrared and ultraviolet applications)
8760G	aser beams, microwaves, and other electromagnetic waves(inc. nmr; for-rays and gamma-rays, see 8760J)
8760I	Medical magnetic resonance imaging and spectroscopy (inc. EPR and NMR)
8760J	corpuscular radiationnd radioisotopes(inc. X-rays and gamma-rays)
8760K	Nuclear medicine, emission tomography (inc. PET and SPECT)
8760L	preparation of radioactive aterials for medical and biomedical uses
8760M	radiation dosimetry
8760P	radiation protection(inc. radiation onitoring)
8760R	radioactive pollution(8670 nvironmental science)
8765	aerospace biophysics and medical hysics (effects of accelerations, weightlessness and environment)(8180 reduced gravity experiments, 9480 aerospace facilities and echniques; space research)
8770	biomedical engineering
8770E	iagnostic methods and instrumentation(8760 medical and biomedical ses of fields, radiations and radioactivity)
8770F	Electrodiagnostics (inc. ECG, EEG, electric impedance imaging and related techniques)
8770G	patient care and treatment
8770H	Radiation therapy (inc. laser surgery)
8770J	prosthetics and other practical pplications
8780	biophysical instrumentation and techniques
8780B	Biosensors (for biomedical aspects, see also 8770)

8790	other topics in iophysics, medical physics, and biomedical engineering
9000	geophysics, astronomy and strophysics
9100	solid earth geophysics
9110	eodesy and gravity(for relations of gravity observations to tectonicsnd isostasy, see 9145 physics of plate tectonics)
9110B	mathematical geodesy;general theory
9110D	cartography
9110J	topography; geometrical observations
9110L	photogrammetry
9110N	rotational variations; polar wobble
9110Q	harmonics of the gravity potential field
9110T	earth tides
9125	geomagnetism and palaeomagnetism; eoelectricity
9125C	origins and models of the magnetic ield; dynamo theories
9125E	interactions between xterior sources and interior properties (magnetotelluric effects)
9125G	spatial variations; all harmonics and nomalies
9125J	spatial variations attributed to sea loor spreading
9125L	time variations; diurnal to ecular
9125N	palaeomagnetism
9125Q	earth's electricity; electromagnetic nduction and conductivity
9130	seismology
9130B	seismic sources (mechanisms, magnitude,oment and frequency spectrum)
9130D	seismicity, space andime distribution(inc. strong motion and shock waves)
9130F	surface and body waves
9130K	free oscillations (periods less than 1ours)
9130M	strong motions and shock waves
9130N	tsunamis(9210)
9130P	phenomena related to earthquake predictio
9130R	explosion seismology
9135	Earth interior
9135C	models of interior structure
9135D	heat flow; geothermy
9135E	structure of the earth's interior belowhe upper mantle
9135G	structure of the crust and upper mantle
9135L	composition of the earth's interior
9135N	geochronology
9140	volcanology
9145	physics of plate tectonics
9145B	Sub-plate scale tectonics (faults, folds, rifts, etc.)
9145D	plate tectonics
9145F	convection currents
9145P	slow vertical crustal ovements(inc. isostasy and postglacial phenomena)
9145S	relations of gravity bservations to tectonics and isostasy
9150	marine geology and geophysics
9150C	beach, coastal and shelf processes
9150E	ocean bottom processes
9150G	bathymetry and noncoastal underwater orphology
9150J	turbidity currents; sedimentation
9160	physical properties of rocks and minerals
9160B	elasticity, fracture and flow
9160F	equations of state
9160H	phase changes
9160K	thermal properties
9160P	magnetic and electric properties
9160W	Other properties of rocks, minerals and soil
9165	geophysical aspects of eology, mineralogy and petrology

9190	other topics in solid earth geophysics
9200	ydrospheric and atmospheric geophysics(for marine geology and eophysics, see 9150)
9210	physics of the oceans(4330 underwater ound)
9210B	physical properties of seawater
9210D	dynamics of the deep ocean
9210F	dynamics of the upper ocean
9210H	surface waves, tides, and sea level
9210J	seiches
9210K	sea-air energy exchange processes
9210L	turbulence, and diffusion
9210M	thermohaline structure and circulation
9210P	underwater light and radiation energy
9210R	sea ice
9210S	coastal and estuarine oceanography
9210V	underwater sound(4330 underwater sound)
9210X	Palaeo-oceanography
9220	interdisciplinary aspects of oceanography
9220C	chemistry of the ocean
9220G	ocean energy extraction
9220J	biological aspects of oceanography
9220N	marine pollution
9240	hydrology and glaciology
9240C	modelling; general theory
9240E	precipitation
9240F	rivers, runoff, and streamflow
9240G	erosion and sedimentation
9240J	evaporation
9240K	groundwater
9240L	soil moisture
9240N	limnology
9240Q	water quality and water resources
9240R	snow
9240S	ice
9240V	glaciers
9260	meteorology(4328 aeroacoustics nd atmospheric sound)
9260B	general circulation
9260D	gravity waves, tides, and compressional aves
9260E	convection, turbulence, and diffusion
9260F	boundary layer structure and processes
9260G	winds and their effects
9260H	chemical composition and chemical nteractions
9260J	water in the atmosphere (humidity, clouds, evaporation, precipitation)
9260L	ionic interactions and processes
9260M	particles and aerosols(9420 hysics of the ionosphere)
9260N	cloud physics
9260P	atmospheric electricity
9260Q	storms
9260S	climatology
9260T	air quality and air pollution
9260V	interaction of atmosphere with lectromagnetic waves; propagation
9260W	solar radiation
9260X	weather analysis and prediction
9260Y	meteorological applications
9260Z	Palaeo-atmosphere
9265	atmospheric optics(4200 optics)
9265D	propagation through the atmosphere,ttenuation,absorption and radiation transfer

9265H	spectral energy distribution, spectral bsorption
9265M	scattering, polarization
9265R	laser beam propagation
9265S	image transmission and formation
9265T	modulation transfer
9265V	clouds, fog, haze, aerosols; ffects of air pollution
9290	other topics in hydrospheric nd atmospheric geophysics
9300	geophysical observations, nstrumentation, and techniques
9330	information related to geographical regions
9330B	africa
9330C	antarctica
9330D	asia
9330F	australia
9330G	europe
9330H	north america
9330J	south america
9330K	large islands (e.g. greenland)
9330L	arctic ocean
9330M	atlantic ocean
9330N	indian ocean
9330P	pacific ocean
9330Q	southern ocean
9330R	regional seas
9330S	polar regions
9330T	temperate regions
9330V	tropical regions
9355	international organizations, national andnternational programs
9365	data acquisition and storage
9385	instrumentation and techniques for eophysical research
9400	aeronomy and space physics
9410	physics of the neutral atmosphere(forlanets, see 9630)
9410B	general properties of the high atmosphere
9410D	Tmospheric structure, pressure, density and temperature(stratospere,esosphere,thermosphere exosphere)
9410F	atmospheric composition (atomic or molecular), chemical reactions and processes
9410G	absorption and scattering of radiation
9410H	atmospheric albedo to particles or waves
9410J	tides, waves, and winds
9410L	convection, diffusion, mixing, urbulence, and fallout
9410N	cosmic dust
9410Q	airglow and nightglow
9410S	aurora
9420	physics of the ionosphere(for planets,ee 9630)
9420B	wave propagation
9420D	ionospheric tructure (D, E, F, and topside regions inc. steady-state)ion ensities and temperatures
9420E	D-region
9420G	E-region
9420J	F-region
9420L	topside region
9420M	plasmasphere
9420P	plasmapause
9420Q	particle precipitation
9420R	interactions between waves and particles
9420S	electric fields
9420T	plasma motion, convection, or irculation
9420V	ionospheric disturbances

9420W	interaction between ionosphere and agnetosphere
9420Z	ionospheric soundings
9430	physics of the magnetosphere(for planets,ee 9630)
9430B	magnetic coordinate systems
9430C	magnetospheric configuration
9430D	magnetopause
9430E	magnetic tail
9430F	plasma motion, convection, or irculation
9430G	plasma instabilities
9430H	trapped particles
9430K	electric fields
9430L	magnetic storms, substorms
9430M	magnetic pulsations
9430N	electrostatic waves
9430P	wave propagation
9430Q	ELF and ULF waves(inc. whistlers)
9430R	VLF waves
9430S	magnetosheath
9430V	interaction between solar wind and agnetosphere
9430W	interactions between magnetosphere andosmic rays
9440	cosmic rays
9440C	origin and propagation outside the solar ystem
9440E	interplanetary propagation and effects
9440H	energetic solar particles and photons
9440K	solar modulation and geophysical effect
9440L	composition and energy spectra
9440N	extensive air showers
9440R	high-energy interactions
9440T	muons and neutrinos
9440V	cosmic-ray effects in meteorites nd terrestrial matter
9460	interplanetary space(9660 solar hysics)
9460D	solar wind magnetic fields
9460F	solar wind electric fields
9460G	solar wind plasma
9460K	interplanetary neutral gases
9460M	interplanetary dust particles
9460Q	solar wind interactions with moonnd planets
9460R	shock waves
9460S	electromagnetic radiation
9460V	Outer heliosphere and interstellar interaction (inc. Heliopause)
9480	aerospace facilities and techniques; space research(8180 educed gravity experiments, 8765 aerospace biophysics and medical hysics)
9480P	lunar and planetary probes and satellite
9480R	artificial earth satellites
9480V	geophysical instrumentation
9480W	astrophysical instrumentation
9490	other topics in space physics
9500	fundamental stronomy and astrophysics, instrumentation and techniques and stronomical observations
9510	fundamental astronomy
9510C	celestial mechanics (for dynamics and kinematics of stellar systems, see 9810)
9510E	orbit determination and improvement
9510G	eclipses, transits and occultations
9510J	astrometry and spherical astronomy
9530	fundamental aspects of astrophysics
9530C	elementary particle and nuclear processes
9530E	atomic and molecular processes and nteractions

9530G	radiation mechanisms
9530J	radiative transfer
9530L	hydrodynamics
9530Q	hydromagnetics and plasmas
9530S	relativity and gravitation (9880 relativistic cosmology)
9545	observatories
9555	astronomical instruments
9555B	astrometric instruments
9555C	optical telescopes
9555E	solar instruments
9555J	radiotelescopes
9555K	X-ray and gamma-ray telescopes
9555L	aerospace instruments(for space echnology, see 9480)
9555P	Lunar, planetary, and deep-space probes
9555S	Auxiliary and recording instruments in astronomy
9555W	Other astronomical and space-research instrumentation (inc. gravitational) (for cosmic ray apparatus, use 9480)
9565	auxiliary and recording instruments
9570	other instrumentation and echniques(inc. clocks, frequency standards)
9575	techniques of observation and reduction
9575D	photography and photometry
9575D	Astronomical photographic and electronic imaging, and photometry
9575F	spectroscopy and spectrometry
9575F	Astronomical spectroscopy
9575H	polarimetry
9575H	Astronomical polarimetry
9575K	interferometry and other special echniques
9575K	Astronomical interferometry
9575M	data and image processing
9575M	Astronomical data and image processing
9575P	mathematical procedures and computer echniques
9575P	Mathematical and computer techniques in astronomy
9575S	Other astronomical techniques
9580	astronomical observations
9580D	radio and radar
9580E	Sub-millimetre astronomical observations
9580G	far infrared (bolometric, hotoconductive)
9580J	photographic region (near nfrared, visible, and normal ultraviolet)
9580M	space ultraviolet
9580N	X-ray
9580Q	gamma-ray and elementary particle
9580S	other (inc. gravitational adiation, magnetograms, etc)
9585	catalogues, atlases etc
9590	other topics in astronomy and strophysics
9600	solar system
9610	general, solar nebula, and cosmogon
9620	moon
9620B	origin, formation, and age
9620D	features, landmarks, ineralogy, petrology and atmosphere
9620J	gravitational field, selenodesy, agnetic fields
9630	planets and satellites(exc. the moon,for celestial mechanics, see 9510; for earth as an astronomical body, see 9100 geophysics)
9630D	mercury
9630E	venus
9630G	mars
9630H	asteroids
9630K	jupiter

9630M	saturn
9630P	Uranus and satellites
9630Q	Neptune and satellites
9630R	Pluto and satellite
9630T	other planets
9630W	Planetary rings
9635	Planetary and satellite characteristics and properties
9635B	Planetary origin, evolution, and ages
9635E	Planetary chemical composition
9635F	Planetary masses, sizes; gravitational fields; rotation; orbits
9635G	Planetary surfaces and topography; tectonics
9635H	Planetary neutral atmospheres
9635K	Planetary ionospheres; magnetospheres
9635M	Planetary interiors
9635P	Planetary electric and magnetic fields
9650	other objects in the planetary system
9650D	nterplanetary matter, magnetic and electric fields(inc. gegenschein nd zodiacal light,9460 interplanetary space)
9650G	comets
9650K	meteors, showers and meteoroids
9650M	meteorites, micrometeorites
9660	solar physics
9660C	general, figure, rotation
9660F	chemical composition
9660H	Solar magnetic and electric fields
9660K	solar interior(inc. neutrino problem)
9660L	Solar oscillations and waves
9660M	photosphere, granulation
9660N	chromosphere and chromosphere-corona ransition
9660P	corona
9660Q	sunspots, faculae, plages
9660R	flares, bursts, and related phenomena
9660S	prominences, and streamers
9660T	solar lectromagnetic radiation and spectra(for geophysical effects, see 9260, 9420, and 9430)
9660V	particle radiation, solar win (9460 interplanetary space)
9690	other topics on the solar system
9700	stars
9710	stellar characteristics
9710B	star formation
9710C	stellar interiors, volution, nucleosynthesis, ages, opacity
9710E	stellar atmospheres, radiative transfer
9710F	circumstellar shells and expanding envelopes
9710H	mass loss and stellar winds; accretion
9710K	stellar rotation
9710L	magnetic and electric fields, rotation
9710N	masses
9710Q	diameters and surface features; oscillation
9710R	luminosities, temperatures
9710T	spectral classification, abundances
9710V	distances, parallaxes
9710W	space motions (proper motions, radial elocities)
9720	normal stars (by class)' eneral or individual
9720D	pre-main-sequence types
9720E	main-sequence' early-type stars (o and b)
9720G	main-sequence' intermediate type a and f tars
9720J	main-sequence' late-type stars (g, k, nd m)

9720L	**giant and subgiant stars**
9720P	**supergiant stars**
9720R	**faint blue stars, white warfs, degenerate stars and nuclei of planetary nebulae**
9720T	**population ii stars**
9720V	**Brown dwarfs**
9730	**variable and peculiar stars(inc. novae)**
9730D	**beta cephei (beta canis majoris) stars**
9730E	**emission-line stars (Of, Wolf- ayet, Be, etc)**
9730F	**magnetic stars**
9730G	**delta cephei, W virginis, RV tauri andelta scuti stars**
9730H	**S, R and N types and related stars**
9730J	**long-period variables (MIRAS) and semi-5egulars**
9730K	**RR lyrae stars**
9730N	**flare stars**
9730Q	**novae, dwarf novae**
9730S	**other types of variables**
9760	**late stages of stellar evolution(inc. lack holes)**
9760B	**supernovae**
9760G	**pulsars**
9760J	**neutron stars**
9760L	**black holes**
9760S	**other objects believed to be isintegrating or collapsing**
9780	**binary and multiple stars(inc. xtrasolar planetary systems)**
9780D	**visual binaries and optical doubles**
9780F	**spectroscopic binaries**
9780G	**Cataclysmic binaries**
9780H	**eclipsing binaries(9870Q X-ray nd gamma-ray sources)**
9780J	**X-ray binaries(9870Q X-ray andamma-ray sources)**
9780K	**multiple stars**
9780M	**planetary systems**
9790	**other topics in stellar astronomy**
9800	**stellar systems; galactic andxtragalactic objects and systems; the universe**
9810	**stellar dynamics**
9820	**stellar clusters and associations**
9820C	**associations of stars (OB, T, etc)**
9820E	**open clusters**
9820G	**globular clusters**
9840	**interstellar matter; and nebulae**
9840B	**interstellar matter(inc. cosmicust, magnetic and electric fields)**
9840C	**interstellar molecules**
9840F	**HI I regions (interstellar clouds and 21-cm absorption lines)**
9840H	**H II regions, emission nebulae**
9840J	**infrared sources (inc. ocoons)(9870L for other sources)**
9840K	**reflection nebulae, dark CLOUDS**
9840L	**Star-forming regions (inc. bipolar outflows)**
9840M	**planetary nebulae**
9840N	**supernova remnants**
9850	**the galaxy, extragalactic objects and ystems**
9850B	**Origin, evolution, and ages of galaxies**
9850C	**Gener alparameters, classifications, etc**
9850D	**Kinematics, dynamics, and rotation of galaxies**
9850E	**formation, structure, content, evolutio**
9850F	**Masses of galaxies**
9850G	**Radiation and spectra of galaxies**
9850H	**red shift, distances**
9850K	**groups, clusters, superclusters**

9850L	**the galaxy; milky way**
9850M	**ocal group galaxies (irregular, spiral and elliptical galaxies in ocal group, Magellanic clouds)**
9850R	**eculiar galaxies (compact nuclei, Seyferts, Markarian objects , BL acertae, etc.)**
9850S	**Radiogalaxies**
9850T	**Intergalactic and ntracluster matter(inc. magnetic and electric fields)**
9870	**other objectsnd background radiations of unknown origin and distances (for ulsars, see 9760G)**
9870D	**discrete radio sources**
9870J	**quasars**
9870L	**IR sources (9840 in nebulae)**
9870N	**Cosmic UV sources**
9870Q	**X-ray and gamma-ray sources**
9870R	**Cosmic gamma-ray sources**
9870S	**cosmic ray sources(for cosmic rays,see 9440)**
9870V	**background radiations**
9880	**cosmology (for observational cosmology, see 9870V; for origin and evolution of alaxy, see 9850)**
9880B	**origin and formation of he universe (big bang, steady state, etc)**
9880D	**relativistic cosmology**
9880F	**origin and formation of the elements**
9880L	**Observational cosmology**
9890	**other topics in galactic and xtragalactic astronomy**