

Nobel Prizes in Physics Closely Connected with the Physics of Solids

- 1901 Wilhelm Conrad Röntgen, Munich, for the discovery of the remarkable rays subsequently named after him
- 1909 Guglielmo Marconi, London, and Ferdinand Braun, Strassburg, for their contributions to the development of wireless telegraphy
- 1913 Heike Kamerlingh Onnes, Leiden, for his investigations on the properties of matter at low temperatures which lead, inter alia, to the production of liquid helium
- 1914 Max von Laue, Frankfort/Main, for his discovery of the diffraction of X-rays by crystals
- 1915 William Henry Bragg, London, and William Lawrence Bragg, Manchester, for their analysis of crystal structure by means of X-rays
- 1918 Max Planck, Berlin, in recognition of the services he rendered to the advancement of Physics by his discovery of energy quanta
- 1920 Charles Edouard Guillaume, Sèvres, in recognition of the service he has rendered to precise measurements in Physics by his discovery of anomalies in nickel steel alloys
- 1921 Albert Einstein, Berlin, for services to Theoretical Physics, and especially for his discovery of the law of the photoelectric effect
- 1923 Robert Andrews Millikan, Pasadena, California, for his work on the elementary charge of electricity and on the photo-electric effect
- 1924 Manne Siegbahn, Uppsala, for his discoveries and researches in the field of X-ray spectroscopy
- 1926 Jean Baptiste Perrin, Paris, for his work on the discontinuous structure of matter, and especially for his discovery of sedimentation equilibrium
- 1928 Owen Willans Richardson, London, for his work on the thermionic phenomenon and especially for his discovery of the law named after him
- 1929 Louis Victor de Broglie, Paris, for his discovery of the wave nature of electrons
- 1930 Venkata Raman, Calcutta, for his work on the scattering of light and for the discovery of the effect named after him
- 1932 Werner Heisenberg, Leipzig, for the creation of quantum mechanics, the application of which has, inter alia, led to the discovery of the allotropic forms of hydrogen

- 1933 Erwin Schrödinger, Berlin, and Paul Adrien Maurice Dirac, Cambridge, for the discovery of new productive forms of atomic theory
- 1937 Clinton Joseph Davisson, New York, N.Y., and George Paget Thomson, London, for their experimental discovery of the diffraction of electrons by crystals
- 1945 Wolfgang Pauli, Zurich, for the discovery of the Exclusion Principle, also called the Pauli Principle
- 1946 Percy Williams Bridgman, Harvard University, Massachusetts, for the invention of an apparatus to produce extremely high pressures and for discoveries he made in the field of high pressure physics
- 1952 Felix Bloch, Stanford University, California, and Edward Mills Purcell, Harvard University, Massachusetts, for the development of new methods for nuclear magnetic precision measurements and the discoveries in connection therewith
- 1954 Max Born, Edinburgh, for his fundamental research in quantum mechanics, especially for his statistical interpretation of the wave-function
- 1956 William Shockley, Pasadena, California, John Bardeen, Urbana, Illinois, and Walter Houser Brattain, Murray Hill, New Jersey, for their investigations on semiconductors and their discovery of the transistor effect
- 1961 Rudolf Ludwig Mössbauer, Munich, for his researches concerning the resonance absorption of gamma radiation and his discovery in this connection of the effect which bears his name
- 1962 Lew Dawidowitsch Landau, Moscow, for his pioneering theories for condensed matter, especially liquid helium
- 1965 Sin-itiro Tomonaga, Tokyo, Julian Seymour Schwinger, Cambridge, Massachusetts, and Richard Phillips Feynman, Pasadena, California, for their fundamental work in quantum electrodynamics, with deep-ploughing consequences for the physics of elementary particles
- 1970 Louis Eugène Felix Néel, Grenoble, for fundamental work and discoveries concerning antiferromagnetism and ferromagnetism which have led to important applications in solid state physics
- 1972 John Bardeen, Urbana, Illinois, Leon Neil Cooper, Providence, Rhode Island, and John Robert Schrieffer, Philadelphia, Pennsylvania, for their theory of superconductivity, usually called the BCS-theory
- 1973 Leo Esaki, Yorktown Heights, New York, and Ivar Giaever, Schenectady, New York, one half for their experimental discoveries regarding tunneling phenomena in semiconductors and superconductors, respectively, and with the other half to Brian David Josephson, Cambridge, U.K., for his theoretical predictions of the properties of a supercurrent through a tunnel barrier, in particular those phenomena which are generally known as the Josephson effects
- 1977 Philip Warren Anderson, Murray Hill, New Jersey, Nevill Francis Mott, Cambridge, U.K., and John Hasbrouck Van Vleck, Cambridge, Massachusetts, for their fundamental theoretical investigations of the electronic structure of magnetic and disordered systems

- 1978 Pyotr Leonidovich Kapitzka, Moscow, for his basic inventions and discoveries in the area of low-temperature physics
- 1981 Kai Manne Siegbahn, Uppsala, for his contribution to the development of high-resolution electron spectroscopy
- 1982 Kenneth Geddes Wilson, Cornell University, New York, for his theory of critical phenomena in connection with phase transitions
- 1985 Klaus von Klitzing, Stuttgart, for the discovery of the quantized Hall effect
- 1986 Ernst Ruska, Berlin, for his fundamental work in electron optics and for the design of the first electron microscope, and the other half jointly to Gerd Binnig and Heinrich Rohrer, Zurich, for their design of the scanning tunneling microscope
- 1987 Johannes Georg Bednorz and Karl Alexander Müller, Zurich, for their important breakthrough in the discovery of superconductivity in ceramic materials
- 1991 Pierre-Gilles de Gennes, Paris, for discovering that methods developed for studying order phenomena in simple systems can be generalized to more complex forms of matter, in particular to liquid crystals and polymers
- 1994 Bertram Neville Brockhouse, McMaster University, Hamilton, Ontario, for the development of neutron spectroscopy, and to Clifford Glenwood Shull, Massachusetts Institute of Technology, Cambridge, Massachusetts, for the development of the neutron diffraction technique
- 1996 David Morris Lee, Cornell University, New York, Douglas Dean Osheroff, Stanford University, California, and Robert Coleman Richardson, Cornell University, New York, for their discovery of superfluidity in helium-3
- 1998 Robert Betts Laughlin, Stanford University, California, Horst Ludwig Störmer, Columbia University, New York, and Daniel Chee Tsui, Princeton University, New Jersey, for their discovery of a new form of quantum fluid with fractionally charged excitations
- 2000 Zhores Ivanovich Alferov, St. Petersburg, Herbert Kroemer, Santa Barbara, California, and Jack St. Clair Kilby, Dallas, Texas, for basic work on information and communication technology, in particular for developing semiconductor hetero-structures used in high-speed- and opto-electronics, and for the invention of the integrated circuit
- 2003 Alexei Alexeyevich Abrikosov, Argonne, Illinois, Vitaly Lazarevich Ginzburg, Moscow, and Anthony James Leggett, Urbana, Illinois, for their pioneering contributions to the theory of superconductors and superfluids
- 2007 Albert Louis Francois Fert, Paris, and Peter Grünberg, Jülich, for the discovery of giant magneto-resistance
- 2009 Willard S. Boyle, Charles Kuen Kao, and George Elwood Smith, Bell Laboratories, Murray Hill, New Jersey, for the invention of an imaging semiconductor circuit—the CCD sensor
- 2010 Andre Geim and Konstantin Novoselov, Manchester, U.K., for discovering and isolating a single free-standing atomic layer of carbon (graphene) and elucidating its remarkable electronic properties

- 2012 Serge Haroche, Collège de France and Ecole Normale Supérieure, Paris, France, and David J. Wineland, National Institute of Standards and Technology and University of Colorado, Boulder, CO, USA, for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems
- 2014 Isamu Akasaki, Meijo University, Nagoya and Nagoya University, Japan, Hiroshi Amano, Nagoya University, Japan, and Shuji Nakamura, University of California, Santa Barbara, CA, USA, for the invention of efficient blue light-emitting diodes which has enabled bright and energy-saving white light sources

Nobel Prizes in Chemistry Closely Connected with the Physics of Solids

- 1920 Walther Nernst, Berlin, in recognition of his work in thermochemistry
- 1936 Peter Debye, Berlin-Dahlem, for his contributions to our knowledge of molecular structure through his investigations on dipole moments and on the diffraction of X-rays and electrons in gases
- 1949 William Francis Giaque, Berkeley, California, for his contributions in the field of chemical thermodynamics, particularly concerning the behaviour of substances at extremely low temperatures
- 1954 Linus Carl Pauling, Pasadena, California, for his research into the nature of the chemical bond and its application to the elucidation of the structure of complex substances
- 1966 Robert Sanderson Mulliken, Chicago, Illinois, for his fundamental work concerning chemical bonds and the electronic structure of molecules by the molecular orbital method
- 1968 Lars Onsager, New Haven, Connecticut, for the discovery of the reciprocity relations bearing his name, which are fundamental for the thermodynamics of irreversible processes
- 1977 Ilya Prigogine, Brussels, for his contribution to non-equilibrium thermodynamics, particularly the theory of dissipative structures
- 1985 Herbert Aaron Hauptman, Buffalo, New York, and Jerome Karle, Washington, DC, for their outstanding achievements in the development of direct methods for the determination of crystal structures
- 1988 Johann Deisenhofer, Dallas, Texas, Robert Huber, Martinsried, and Hartmut Michel, Frankfurt/Main, for the determination of the three-dimensional structure of a photosynthetic reaction centre
- 1991 Richard Robert Ernst, Zurich, for his contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy
- 1996 Robert Floyd Curl, Jr., Rice University, Houston, Texas, Harold Walter Kroto, University of Sussex, and Richard Errett Smalley, Rice University, for their discovery of fullerenes

- 1998 Walter Kohn, Santa Barbara, California, for his development of the density-functional theory, and John Anthony Pople, Northwestern University, Evanston, Illinois, for his development of computational methods in quantum chemistry
- 2000 Alan Jay Heeger, Santa Barbara, California, Alan Graham MacDiarmid, Philadelphia, Pennsylvania, and Hideki Shirakawa, Tsukuba, for the discovery and development of conductive polymers
- 2007 Gerhard Ertl, Fritz-Haber Institut, Berlin, for his studies of chemical processes at solid surfaces
- 2011 Daniel Shechtman, Technion, Haifa, for the discovery of quasi-crystals
- 2014 Eric Betzig, Howard Hughes Medical Institute, Ashburn, VA, USA, Stefan W. Hell, Max Planck Institute for Biophysical Chemistry, Göttingen, and German Cancer Research Center, Heidelberg, Germany, and William E. Moerner, Stanford University, Stanford, CA, USA, for the development of super-resolved fluorescence microscopy

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