

Isidor Rabi—1944 Nobel Laureate in Physics

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Isidor Isaac Rabi was awarded the 1944 Nobel Prize in physics for his development of the atomic and molecular beam magnetic resonance method of observing atomic spectra. This method (developed in the 1930s) made it possible to measure the magnetic properties of atoms, atomic nuclei, and molecules. The method is based on measuring the spin of the protons in the atom's core, a phenomenon known as nuclear magnetic moments. With the application of Rabi's magnetic resonance method, several mechanical and magnetic properties, as well as the shape, of an atomic nucleus can be deduced. The precise measurements yielded by this method made possible such subsequent applications as the atomic clock, the maser, the laser, and nuclear magnetic resonance imaging used in diagnostic medicine. Rabi's method provided the central technique for virtually all molecular and atomic beam experimentation.

Isidor Rabi was born on July 29, 1898, in Rymanov, Austria (now in Poland). He was the older of 2 children. When Isidor was 1 year old, his family immigrated to the United States, where they settled in New York City. His father became the owner of a grocery store.

Rabi's early education was obtained in the New York City public schools; for his secondary education, he attended the Manual Training High School in Brooklyn, NY. He won a New York State scholarship that enabled him to attend Cornell University in Ithaca, NY. He started his college career in 1916 as an electrical engineering student but soon transferred to a major in chemistry. He obtained the BS degree in 1919.

After college graduation, Rabi worked for 3 years as a chemist before returning, in 1922, to Cornell University for graduate work in chemistry. However, he changed his major to physics and, in 1926, was awarded the PhD degree in physics for a thesis on the measurement of the magnetic properties of crystals.

Rabi was awarded a 2-year fellowship for postgraduate work in Europe, where he worked with

such eminent physicists as Niels Bohr (1885-1962), Wolfgang Pauli (1900-1958), Otto Stern (1888-1969), Werner Heisenberg (1901-1976), Erwin Schrödinger (1887-1961), and Arnold Sommerfeld (1868-1951). In 1929, Rabi returned to the United States and joined the faculty of Columbia University (New York City), where he worked from 1929 to 1967. He was appointed professor of physics at the university in 1937, university professor in 1964, and professor emeritus in 1967.

While on the faculty of Columbia University, Rabi worked in various capacities for the US government. From 1940 to 1945, he led a group of scientists at the Massachusetts Institute of Technology in Cambridge, where he helped develop radar for World War II (1939-1945). He also was associate director of the Radiation Laboratory at the Massachusetts Institute of Technology. He served on the Atomic Energy Commission, eventually succeeding J. Robert Oppenheimer (1904-1967) as chair. Rabi was chair of the Atomic Energy Commission from 1952 to 1957.

As a member of the American delegation to the United Nations Educational, Scientific, and Cultural Organization, Rabi was prominent in the movement that led to the founding of the international laboratory for high-energy physics in Geneva, Switzerland, known as CERN. He also was one of the founders of the Brookhaven National Laboratory in Upton, New York.

Rabi was the author of many scientific articles, covering such fields as magnetism, quantum mechanics, nuclear physics, and molecular beams. His writings included *My Life and Times as a Physicist* (1960) and *Science: The Center of Culture* (1970).

Besides the Nobel Prize, Rabi received many awards and honors, including honorary doctorates and membership in prestigious scientific organizations. On January 11, 1988, at the age of 89 years, Rabi died in New York City. He was honored as a Nobel laureate in physics on a stamp (Scott No. 2130c) issued in 2001 by Guinea.

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