# Curriculum Vitae Professor Dr Enrico Fermi

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**Name:** **Enrico Fermi**
**Life Dates:** **29 September 1901 - 28 November 1954**

Enrico Fermi was an Italian-born American nuclear physicist. The element fermium with the atomic number 100, the free electron Fermi gas, the fermions, a group of elementary particles as well as the Fermi level, which describes the energy level within solids, are all named after him. In 1938, Fermi was awarded the Nobel Prize in Physics for determining new radioactive elements and discovering nuclear reactions caused by neutrons.

## Academic and Professional Career

In 1918, at the age of 17, Enrico Fermi enrolled at the University of Pisa, Italy, to study physics. In 1922, he earned his doctorate with a dissertation on the diffraction of X-rays by curved crystal surfaces. In the same year, he spent a semester studying under Max Born, who later received the Nobel Prize in Physics, in Göttingen, Germany, – the leading centre of theoretical physics back then. Between 1923 and 1929, Enrico Fermi lectured chemistry at the University of Rome, Italy. In 1924, he spent another year studying abroad, this time in the Dutch City of Leiden, where he worked for Paul Ehrenfest, one of the founders of quantum mechanics. From 1924 to 1926, he taught mathematical physics and mechanics at the University of Florence, Italy. During this time, Fermi statistics and Fermi-Dirac statistics laid the foundation for quantum statistical mechanics regarding the theory of atomic nuclei and electron shells as well as the theory of metals.

In 1927, Fermi won the Chair of Theoretical Physics at the University of Rome, until he emigrated to the United States in 1938. He was appointed professor of physics at Columbia University in New York, USA, where he began his research on nuclear fission in 1942, which he later continued at the University of Chicago, USA. His studies led to the creation of the first nuclear reactor.

Fermi was among the scientists who took part in the military Manhattan Project in 1944. In the summer of that year, he moved with his family to Los Alamos, New Mexico, USA, where he was

involved in constructing the first atomic bomb in a secret laboratory for nuclear research as an adviser to Robert Oppenheimer.

After the end of the Second World War in 1945, Fermi was appointed professor at the Institute for Nuclear Studies at the University of Chicago, a position he held until his death in 1954.

**1938 Nobel Prize in Physics**

During his time in Rome, Fermi already conducted experiments to prove artificial radioactivity, which involved bombarding substances with neutrons. A number of chemical elements of the periodic system were successfully transmuted this way, with some of the tested substances becoming radioactive. Fermi inferred that the radioactivity was caused by the absorption of neutrons by the respective atomic nucleus which resulted in three types of reactions. Without knowing, Fermi was the first to achieve nuclear fission of heavy nuclei with these experiments. This way, he produced over 400 new radioactive substances.

In 1938, Fermi was awarded the Nobel Prize in Physics – the same year in which he had to leave his home country due to the political circumstances. Fermi went to Stockholm, Sweden, for the Nobel Prize award ceremony and moved on to New York, where he resumed his research on neutrons.

Even before, the German chemists Otto Hahn and Fritz Strassmann had achieved the first nuclear fission. Like other scientists, Fermi discovered that the fission of uranium nuclei released a large amount of energy and he suspected that a side effect of this nuclear fission was the emission of neutrons, which in turn could split more uranium nuclei, leading to a chain reaction.

In the meantime, due to the political situation in Europe during the Second World War, the American government promoted research on the possible use of nuclear energy. Thus, under Fermi's supervision, the first nuclear reactor was created as part of a secret research project in a squash court in Chicago, USA, where eventually, on 2 December 1942, the first controlled nuclear chain reaction took place.

**Honours and Awarded Memberships**

In addition to the Nobel Prize, Enrico Fermi received numerous awards, such as the Matteucci Medal (1926), the Hughes Medal (1942), the Medal for Merit (1946), the Franklin Medal (1947), the Barnard Medal for Meritorious Service to Science (1950), the Rumford Prize (1953) as well as the Max Planck Medal (1954).

He was a member of various scientific associations and academies, such as the Royal Academy of Italy (1929), the German National Academy of Sciences Leopoldina (1935), the Accademia Nazionale dei Lincei of Rome, American Philosophical Society of Philadelphia (1939), Corresponding Member of the Accademia delle Scienze of Turin, the Academy of Sciences of the Soviet Union in Moscow, the National Academy of Sciences, India, as well as Foreign Member the Royal Society in London (1950).

**About Enrico Fermi**

Enrico Fermi was born on 29 September 1901 in Rome. He was the third child of the chief inspector of the Ministry of Communications Albert Fermi and the primary school teacher Ida de Gattis. His sister Maria was two years older than him, his brother Giulio one year. Giulio died in 1915 of complications with anaesthesia. Enrico spent the first two and a half years of his life in a rural town with his brother, where he was raised by a wet nurse, then returned to his family in Rome. In 1928, Enrico Fermi married his former fellow student Laura Capon. The couple had two children. After the fascist dictatorship rose to power in Italy and because Laura was Jewish, the Fermis emigrated to the United States in 1938. In 1944, they attained American citizenship.

To this day, Fermi's name is omnipresent in public: For instance, the Atomic Energy Agency of the United States named their Enrico Fermi Award in his honour. The Fermi National Accelerator Laboratory (Fermilab) located in Batavia, Illinois, and the space telescope Fermi Gamma-ray Space Telescope also bear his name.

Enrico Fermi died on 28 November 1954 in Chicago.