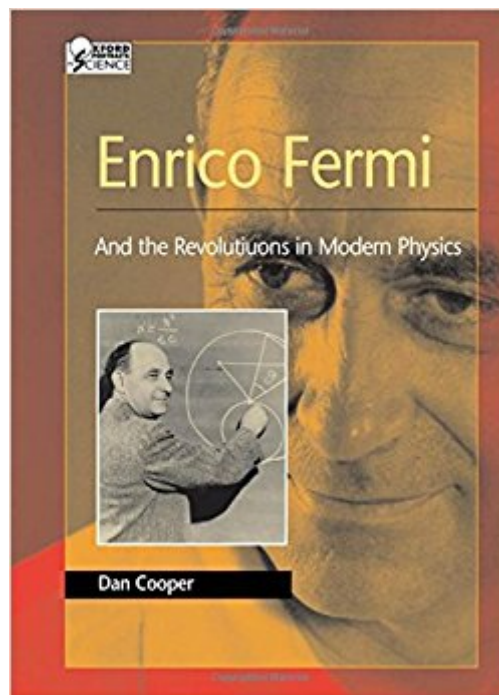




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# Enrico Fermi: And The Revolutions Of Modern Physics (Oxford Portraits In Science)



## Synopsis

In 1938, at the age of 37, Enrico Fermi was awarded the Nobel Prize in Physics. That same year he emigrated from Italy to the United States and, in the course of his experiments, discovered nuclear fission--a process which forms the basis of nuclear power and atomic bombs. Soon the brilliant physicist was involved in the top secret race to produce the deadliest weapon on Earth. He created the first self-sustaining chain reaction, devised new methods for purifying plutonium, and eventually participated in the first atomic test. This compelling biography traces Fermi's education in Italy, his meteoric career in the scientific world, his escape from fascism to America, and the ingenious experiments he devised and conducted at the University of Rome, Columbia University, and the Los Alamos laboratory. The book also presents a mini-course in quantum and nuclear physics in an accessible, fast-paced narrative that invokes all the dizzying passion of Fermi's brilliant discoveries. Oxford Portraits in Science is an on-going series of scientific biographies for young adults. Written by top scholars and writers, each biography examines the personality of its subject as well as the thought process leading to his or her discoveries. These illustrated biographies combine accessible technical information with compelling personal stories to portray the scientists whose work has shaped our understanding of the natural world.

## Book Information

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## Customer Reviews

"A balanced discussion of the scientist's life and work... particularly informative. Full-page sidebars explain principles related to the physicist's research... Captioned black and white photographs of Fermi, his family, and his colleagues add interest. This book will be useful for reports... challenging reading... extensive list for further reading."--School Library Journal

"Personal anecdotes mix well with science to provide a well-rounded picture of Fermi and his friends and associates. Fermi comes across as a brilliant, warm, and approachable person. That was his strength and is the book's strength as well. The black-and-white illustrations are crisp, appropriate, and enhance the text. An excellent short bibliography and a useful index make the book more valuable for its intended audience."--Science Books & Films

This book follows the career of Enrico Fermi through the revolutions in physics that took place in the first half of the 20th century: Einstein's theory of relativity; the confirmation of the fact that matter is composed of atoms which in themselves were made up of a tiny nucleus and electrons which behaved in ways incomprehensible to 19th century ideas; the profound contributions of Max Planck, Niels Bohr, Werner Heisenberg, Erwin Schroedinger and Paul Dirac to the development of quantum theory which was needed to explain the behavior of atoms and molecules (collections of atoms bound together) and which are the constituents of matter (solids, liquids, gases); the theory of the interaction of light with matter and the recognition that light (electromagnetic radiation) behaved sometimes like waves and sometimes like particles, called photons; the recognition that the atomic nucleus itself was made up of constituents called protons (the nucleus of the hydrogen atom) and a new particle called a neutron; and finally the explosion of new particles created in very high energy collisions of neutrons, protons, photons, and electrons consistent with Einstein's famous relation  $E=mc^2$  according to which given enough energy, particles of various masses could be created. Fermi lived through the beginning of this last (and still vigorously ongoing) revolution and in his characteristic way became a contributor to its understanding. Cooper carefully describes Fermi's development as a scientist, leaning on Emilio Segre's bio of Fermi. Cooper makes a serious effort to teach a little about nuclear physics and quantum theory that helps make the narrative more comfortable for non-scientists. It is very difficult to convey the power and importance of Fermi's contributions to physics to non-specialists. Fermi's great talent was to use the discoveries of others in incredibly clever ways that enormously deepened our understanding of physics. The example most often quoted, which is elaborated on most in Cooper's book, is the work of Fermi and his group in Rome using slow neutrons to bombard atomic nuclei. It is

ironic (and something that bothered Fermi mightily) that in the course of this research the group thought they were producing transuranic elements (that is, elements heavier than the heaviest known nucleus, uranium) when in fact the target uranium nucleus had actually split in two, the process called fission. This was not recognized by the Rome group and their ultra careful leader Fermi. It was, of course, nuclear fission that led to the famous nuclear chain reaction in Chicago in 1942 and ultimately led to the development of the atomic bomb in 1945. The 1942 chain reaction was truly Fermi's baby and he was a major contributor to the bomb project as well. Cooper's book is very fine, but not having known Fermi makes it very difficult for Cooper to convey the aura that surrounded his subject. Segre's book comes closer in this regard, and it would be a natural place to turn for readers who wish to gain additional insights about one of the towering figures in modern physics.

I was excited about this book, and was looking forward to learning about the life of one of the greatest scientists of all time. Unfortunately though I was really disappointed. A good biography has the ability to make you feel like you knew the person, and have some insights about their life. I didn't feel that way at all after reading this book. It certainly covers the basics, and gave an accurate timeline. But, it does not have the personal anecdotes, and first-person accounts that are really engaging. I felt like I learned more about Fermi as a person from Rhodes' "The Making of the Atomic Bomb" than I did from this book.

I'm the author of this book. I sought to show how physics is done and how one of the greatest scientists of our time used his fine mind and friendly yet competitive ways to succeed. I believe I've made Fermi, the man, and the physics he did accessible to a wide range of readers. Don't be put off if you found physics hard in school -- this isn't like that, and it ain't brain surgery. Fermi was famous for being one of those very rare physicists who are good at both theory and experiment. That helped as he and his team did the neutron experiments that led to his 1938 Nobel Prize. After a dramatic escape from fascist Italy, he and his family emigrated to America. There he went on to create the first nuclear chain reaction (on December 2, 1942) and to play a major role in the development of the atom bomb. After helping to win World War II, he helped set sensible science policy and did more great physics. His name is enshrined in the element Fermium, in the Fermi National Accelerator Lab, and in some of the most important concepts of physics. This book is a good way to learn about a great man and about the way the physical world works. I hope you'll enjoy it; let me know what you think of it.

This is the perfect biography for anyone wanting to learn more about a great man, one of the greatest physicists. Enough of his physics were mentioned or included to make it non-trivial to me (junior astrophysics major, with Fermi distribution functions currently flying out of my ears) and yet I would have no compunctions handing this book to my little cousins in elementary school if they needed to read/write a book report on the life and accomplishments of one of the greatest and most influential scientists of our era. In fact, I would say that is the preferred audience, all physics students have heard of Fermi, but most children (and indeed, most adults) are unaware of his contributions to the way we see the world around us, and to history. All of that is here, in this biography easily accesible to anyone.

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