



NOBEL LAUREATE AND ROLE MODEL MARIA GOEPPERT MAYER MADE LASTING IMPRINT ON PHYSICS

Maria Goeppert Mayer, a member of Argonne's staff from 1946 to 1959, is one of only three women to receive the Nobel Prize in Physics.

BACKGROUND

Maria Goeppert Mayer was born in Germany in 1906 and attended the University of Göttingen, where she studied Theoretical Physics under Nobel laureate Max Born. She earned her Ph.D. in 1930.

Goeppert Mayer came to the United States in 1939 with her American husband, chemical physicist Joseph Mayer. In 1946, Goeppert Mayer and her husband began working at the University of Chicago's Institute for Nuclear Studies and Argonne National Laboratory.

While working in Chicago, Goeppert Mayer became interested in understanding why some atomic nuclei were inherently more stable than others.

THE PIVOTAL DISCOVERY

In considering the properties of atomic nuclei, Goeppert Mayer found there were particular numbers – “magic numbers” – of protons and neutrons that kept turning up in particularly stable nuclei. She wondered why that would be since it didn't fit with the accepted model of the structure of atomic nuclei.

During a 1948 conversation about her work with famous physicist Enrico Fermi, he asked her, “Is there any evidence of spin-orbit coupling?” It was known that electrons occur in pairs, with each electron spinning in a different direction, but no one had ever considered that protons and neutrons might be doing the same thing.

Goeppert Mayer immediately realized that was exactly what was happening. That night, she completed her calculations and emerged the next day with a new model of the atomic nucleus – the “Nuclear Shell Model.”

THE IMPACT

- Goeppert Mayer's discovery triggered a fundamental change in how physicists thought of what was going on inside the nucleus of an atom, and the idea quickly spread throughout the world.
- At the same time Goeppert Mayer was developing the nuclear shell model, two other scientists were independently working on it as well. In 1963, all three were given the Nobel Prize in Physics for this discovery.
- Goeppert Mayer is one of only three women to receive the Nobel Prize in Physics.

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