Lester Halbert Germer Biography

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Contents

Biography

Lester Germer, along with his colleague American physicist **Clinton Davisson**, conducted an experiment in 1927 that first demonstrated the wave properties of an **electron**. Germer's experiment confirmed an earlier hypothesis suggested by French physicist Louis Victor de Broglie. Germer's work came a critical time during the development of **quantum theory**. The experiments of Germer and Davisson helped validate the mathematically complex atomic models proposed by de Broglie and Austrian physicist **Erwin Schrödinger** that predicted a particle and wave duality for electrons (i.e., that electrons should show properties of both particles and electromagnetic **waves**).

Born in Chicago, Illinois, Germer exhibited precocious mathematical ability as a child, and later became a graduate student under the tutelage of Davisson at Columbia University. While working at the Bell Laboratories in New York City in 1927, Germer and Davisson experimented with directing a beam of electrons of known **energy** onto the surface of polycrystalline nickel. Germer and Davisson measured the various angles at which electrons bounced off of the surface. When measured, the scattered electrons showed peaks precisely where predicted by wave theory (i.e., an intense reflected beam was observed in accord with the Bragg condition for constructive **interference**). In a stroke of serendipity the experiment was altered when air accidentally entered the tube that contained target nickel. An oxide film formed on the surface of the nickel crystals and resulted in the production of crystalline structure consistent with wavelike electron defraction patterns. Germer and Davisson correctly asserted that their experiments argued for a **particle-wave duality** in electrons, a fundamental postulate of modern quantum **mechanics**.

Scientists use the wavelike properties of electrons discovered by Germer in a number of applications, including the **electron microscope**.