

Cecil Frank Powell Biography

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Biography

Powell was born in Tonbridge, England, on December 5, 1903. He earned scholarships first at the Judd School in Tonbridge, and then at Cambridge. He received his undergraduate degree from Cambridge in 1925 and his Ph.D. from the same institution in 1927. Powell's academic career was devoted to a study of particles produced by cosmic ray bombardment in the atmosphere. In this research, he used one of the simplest tools imaginable, the photographic plate. Scientists had long known that subatomic particles leave easily detectable tracks when passing through a photographic emulsion. The particles ionize silver iodide molecules, resulting in the formation of silver atoms that are observable after the plate has been developed. Furthermore, the velocity, charge, and other characteristics of the particles can be inferred from the nature of the tracks produced. Powell developed highly sensitive photographic plates and tested them by exposing them on top of the Pic du Midi, in the Pyrenees Mountains, at an altitude of 8858 feet (2,700 meters). His success with this project led him to try an even more ambitious approach. He used hydrogen-filled balloons to carry photographic plates high into the atmosphere. At altitudes of nearly 100,000 feet (30,000 meters), the plates were able to detect nuclear reactions that occur when cosmic ray secondaries (primarily alpha particles and protons) collide with air molecules. The most important result of this research was the discovery of the pi meson (pion). In 1935, the Japanese physicist, Hideki Yukawa, had predicted the existence of a subatomic particle that can carry the strong force. Carl David Anderson's discovery of the mu meson (muon) seemed, at first, to confirm Yukawa's prediction. Even though the muon had the correct mass, however, it lacked other characteristics required by Yukawa's prediction. Powell was able to show that the muon is formed during the decay of the pion. The pion decays so quickly that it had been undetected by other methods used in cosmic ray analysis. He also demonstrated that the pion had all the characteristics required by Yukawa's theory. For this research, Powell was awarded the Nobel Prize for physics in 1950. After receiving his Ph.D., Powell had accepted a position at the University of Bristol. He became Melville Wills Professor of Physics at Bristol in 1948 and director of the Wills Physical Laboratory there in 1964. He died near Milan, Italy on August 9, 1969.