

Topic Page: [Shull, Clifford, 1915–2001](#)

Definition: **Shull, Clifford G(lenwood)** from *Chambers Biographical Dictionary*

1915-2001

US physicist and Nobel Prize winner

Born in Pittsburgh, Pennsylvania, he was educated at the Carnegie Institute of Technology and New York University. He worked as a research physicist during World War II studying catalysts used in the production of high-performance aviation fuel, and later moved to Oak Ridge National Laboratory, Tennessee (1946-55). He lectured at the Massachusetts Institute of Technology from 1955 to 1986. In 1994 he shared the Nobel Prize in physics (with Bertram Brockhouse) for the development of the neutron diffraction technique.

Summary Article: **Shull, Clifford G**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

US physicist who, with Bertram Brockhouse, was awarded the Nobel Prize for Physics in 1994 for the development of neutron diffraction techniques used for studying the structure and properties of matter and which led to advances in semiconductor technology. Shull used neutron scattering techniques to answer questions that the similar technique of X-ray diffraction had failed to answer, such as where the atoms of the light element hydrogen are located in an ice crystal. He also showed how neutrons can reveal the magnetic properties of metals and alloys.

One of Shull's discoveries was that the diffraction pattern of a proton is different from that of a deuteron – a proton and a neutron combined. He produced new insights into the hydrogen bond in water by comparing the diffraction patterns produced by water and deuterium oxide. He also showed that magnetic interactions between neutrons and atoms also produced diffraction patterns. He established the existence of antiferromagnetic materials, in which one half of the atoms align magnetically in one direction and half in the other.

Shull was born in Pittsburgh, Pennsylvania, USA. He studied physics at the Carnegie Institute of Technology (now Carnegie Mellon University), Pittsburgh, and moved to New York University for graduate studies, completing his doctorate in 1941. He became familiar with diffraction and crystallography when working in the research laboratory of The Texas Company in Beacon, New York, 1941–46. In 1946 he moved to the Clinton Laboratory (now Oak Ridge National Laboratory) in Tennessee where he worked on neutron diffraction. In 1955 he moved to the Massachusetts Institute of Technology (MIT), in Cambridge, Massachusetts. He retired from MIT in 1986.

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Chicago

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