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Per 2 PIB Physics 1

Clifford B Shull

Clifford B Shull was born on September 23, 1915 in Pittsburg, Pennsylvania. Shull was the youngest of three and went by Glenwood which was his middle name. Shull attended Schenley High School and wasn't interested as having a career in physics until his senior year when he took physics. For his college years Shull received a half-tuition scholarship to Carnegie tech where his interest and ability in physics greatly sharpened. After Shull graduated in 1937 he attended graduate school at New York University in the fall of 1937. At New York university Shull became associated with a nuclear physics group headed by Frank Myers and Robert Huntoon, who were in the process of building a 200 keV Cockroft-Walton generator for accelerating deuterons. During his 3rd year at New York University the physics department decided that they would be able to fund the construction of a 400 keV Van de Graaff generator that would be used for accelerating electrons. Also during his third year he performed an electron-double-scattering experiment that went on for four months before all the data was taken and Shull was ready to write his thesis and take his PhD during 1941. In Shull's first year of Graduate school he met Martha-Nuel Summer the woman who he would eventually marry. After graduate school when the war started Shull was encouraged to help work in the Manhattan project which was the development of the atomic bomb but turned down the offer because he was working with a company in Beacon, NY which would not accept his wartime job change. While in Beacon Shull studied catalysts using gas absorption and x ray diffraction and scattering tools. This came in handy for the production of high performance aviation fuel. After the war

Shull obtained a growing interest in nuclear physics visited the Clinton Laboratory in Tennessee. The activity going on at this laboratory fascinated Shull so much that Shull convinced his wife to move there. Shull worked at Oak Ridge where he made his discoveries for what would later be awarded in the form of a Nobel Prize. In 1951 Shull left Tennessee to pursue an academic life at the Massachusetts Institute of Technology. Shull retired from MIT in 1986 and was awarded the Nobel Prize for pioneering contributions to the development of neutron scattering techniques for studies of condensed matter. Shull was a great scientist and teacher and passed away at the age of 85. Shull did not win the Nobel Prize until 40 years after his discoveries were made.

Shull was awarded the Nobel Prize for pioneering contributions to the development of neutron scattering techniques for studies of condensed matter. This is significant because neutron scattering techniques are "tools for learning things about materials," (tech.mit.edu) with this information scientist can find very basic information that can help figure out the physical properties of materials. Shull, in simple terms, helped answered the question of where atoms are. Some of Shull's past discoveries helped produce aviation fuel used in WWII which was very important to the US war effort

Shull's work was done at Oak Ridge National Laboratory in Tennessee from 1946 to 1951. This research was partly influenced by Shull's growing interest nuclear physics after the Manhattan project during WWII. Also Shull's association in EDS (Electron-Double-Scattering) during his time at NYU also influenced his involvement in this research. One more thing that influenced this research was work that Shull did at Beacon which involved studying the microstructure catalysts using gas adsorption, x-ray diffraction, and scattering as tools for characterizing the physical structure of these materials. This research prior to the primary research helped the production of high performance aviation fuel which had a large role in

WWII. Shull did this because of his interest in nuclear physics. This experiment helped supplement the neutron patterns obtained by x-rays and electrons. Shull came up with his results by way of systematically investigating the fundamental principles of elastic neutron scattering. Shull's discoveries have been used to advance in fields like polymers and superconductivity. A spectrometer was used to obtain neutron diffraction patterns of crystals and materials. Shull was mainly involved in elastic scattering of neutrons. This data was received by way of having a beam shot at a target material that scatters as atoms bounce off the material. Knowing where atoms are and how they interact is a crucial part of electronics. Shull's pioneer work helps us today understand a lot of electronics. After Shull announced his work the US built more neutron sources to study more materials