



ERWIN W. MUELLER
1911-1977

Erwin Mueller was a much-admired and respected member of the Penn State Department of Physics from 1952 to 1977. His work was given the highest recognition when he was awarded the National Medal of Science in 1977.

He studied physics at the Technical University in Berlin under Gustav Hertz and obtained his doctoral degree in 1936. His habilitation was granted by the same university in 1950. Prior to the appointment at Penn State, he held research positions at Siemens Research Laboratory, Stabilovolt Company, Kaiser-Wilhelm Institute for Physical Chemistry, the Technical University in Berlin, and the Free University of West Berlin.

His first major achievement was the invention of the field emission microscope in 1936. This enabled him to image the surface of submicroscopic metal tips with a resolution of about 20 Å. For the first time, diffusion and rearrangement of surface layers could be seen vividly. The direct observations made possible with this instrument were important, as the understanding of various atomic processes on solid surfaces grew. In 1951 he invented the field ion microscope, capable of giving a resolution of 2.5 Å. This provided the first sharp, clear view of crystals on an atomic scale, showing the individual atoms and their arrangement on the surface. For this achievement he became famous as the first person to "see" atoms. In 1967 he once again

significantly advanced microscopy with the invention of the atom-probe field ion microscope. This instrument can aim at a single atom in a crystal surface, separate it from the surrounding atoms, and identify it by its mass. The precision clearly distinguished different isotopes of elements.

His achievements were recognized by numerous awards, including the Davison-Germer Prize of the American Physical Society and the C. F. Gauss Medal, Braunschweig, Germany. He held honorary doctoral degrees from the Free University of Berlin and from the Claude-Bernard University of Lyon. He was an elected and honorary member of many scientific societies, including the Deutsche Akademie der Naturforscher, the National Academy of Engineering, and the National Academy of Sciences.