

WE HEAR THAT

Francis Yost

Francis Lorraine Yost, emeritus professor of physics at the University of Kentucky in Lexington, died on 6 October 1989. He was 81 years old.

Yost received his bachelor's and master's degrees in physics from the University of Kentucky, finishing in 1931. He earned his PhD from the University of Wisconsin in 1936. Together with his thesis adviser Gregory Breit and John A. Wheeler of the University of North Carolina, Yost published analytical methods for solving the Coulomb Schrödinger equation, which previously had only been solved using the WKB approximation. In a famous 1936 paper (*Physical Review* **49**, 174) Yost, Wheeler and Breit gave the first exact solutions to the repulsive Coulomb potential. Their further work established the importance of these exact solutions for obtaining realistic Coulomb penetrabilities.

In 1936 Yost joined the physics department at Purdue University, where he collaborated with Lothar W. Nordheim. In another landmark paper (*Physical Review* **51**, 942, 1937) the two showed the rather large influence of Coulomb distortions on the interpretation of β -decay rates and on the extraction of matrix elements from decay intensities. Yost went on to assume a series of physics posts in the Washington, DC, area. From 1946 to 1954 he was at the US Naval Ordnance Laboratory, first as chief of the mathematics analysis division and later as chief of the weapons analysis division.

In 1954 Yost returned to Kentucky to become head of the physics department. In 1965 he left that position, but he remained a professor until his retirement in 1973.

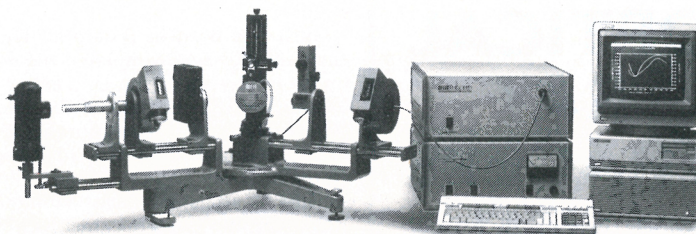
In the mid-1960s Yost developed an introductory course for students with little mathematics background. Under his leadership, the two-semester course, taught from a textbook that Yost himself had written, became so popular that the enrollment swelled to as many as 1500 students.

Yost became known, particularly in his later years, as a man with a dry, sardonic wit. He especially enjoyed telling stories featuring his own foibles.

MARCUS T. McELLISTREM
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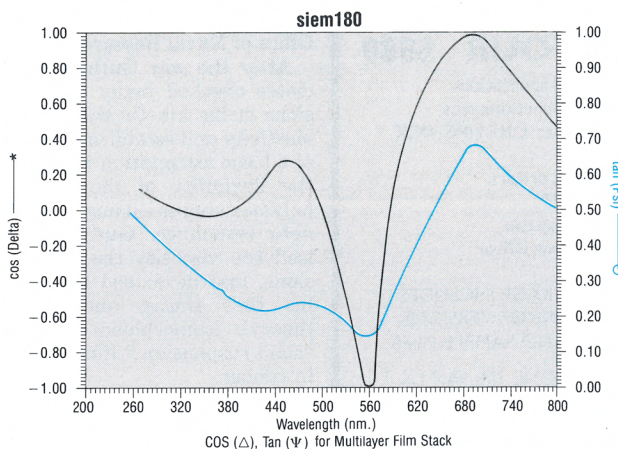
Eugene Guth

Eugene Guth, 84, died on 5 July 1990 from complications following a heart attack. He was an internationally



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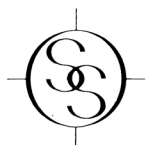
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known figure in physics and polymer science.

Guth was born in Budapest, Hungary, in 1905 and completed his doctorate in physics at the University of Vienna in 1928. In 1929, at the age of 23, he wrote the first comprehensive history of quantum theory, a 170-page *Handbuch der Physik* article. Guth worked as a postdoc under Wolfgang Pauli at the Federal Institute of Technology in Zurich and under Werner Heisenberg at the University of Leipzig. He then returned to the University of Vienna, where he was a physics professor from 1932 to 1937.

While in Vienna, Guth developed with his lifelong friend and colleague Herman F. Mark a model of the statistical mechanics of polymers that became a cornerstone of the kinetic theory of rubber elasticity. A. J. Staverman, an authority on the chemical physics of polymers, described this model as a great stride "comparable to the conception of the kinetic theory of gases."

In 1937 Guth joined the physics faculty at the University of Notre Dame, where he became the first Research Professor. Beginning in 1930 Guth, in collaboration with Hubert M. James, developed the first quantitative network theory of rubber elasticity. During World War II, Guth directed a team of researchers designing synthetic rubber for the Office of Naval Research.

After the war Guth and his associates checked many of the conclusions of his kinetic theory of rubber elasticity and established the validity of a basic assumption of the theory—the flexibility of the "strings," or polymer chains—using nuclear magnetic resonance. Guth also generalized the viscosity theory of suspensions, first developed by Einstein in his PhD thesis, and proved the theory's isomorphism to that of a "solid suspension," like carbon black in rubber.

In 1956 Guth moved to Oak Ridge National Laboratory to become technical adviser to the lab's director, Alvin Weinberg—a position Guth held until his retirement in 1971. After leaving Oak Ridge, Guth became a visiting professor at Rice University and taught part-time at the University of Tennessee, Knoxville.

Guth's contributions to nuclear physics were extensive. He suggested and participated in the first experiment to disintegrate nuclei using electrons. He also proposed the first detailed theory of the nuclear photoeffect, which included the first nuclear application of the distorted-wave Born approximation, the first



Eugene Guth

exact theoretical work on Coulomb excitation, and the first treatment of nuclear excitation by x rays (closely related to the Mössbauer effect). Coulomb fission, one of the few forms of fission discovered since 1966, was first predicted by Guth and Lawrence Willets, and has recently been observed.

Guth also published several important results in solid-state physics. He and Mayerhöfer published a paper discussing the limits of Ohm's law at high current densities, convincing Percy W. Bridgman that his experimental results were *not* related to deviations from Ohm's law. Also, Guth and Mullin produced the first theory of emission of electrons from metals in electric fields, explaining, among other things, the periodic deviations from the Schottky line.

At the time of his death, Guth had an honorary professorship in the physics and astronomy department at Knoxville. Guth finished one of his papers, a short note on rubber elasticity coauthored by Herman Mark, just a few weeks prior to his death.

Guth will be remembered by his friends and colleagues for giving generously of his time, for helping younger scientists get started in their careers, and for remembering a remarkably extensive collection of details and events surrounding the discoveries in quantum mechanics in the 1920s and 1930s.

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