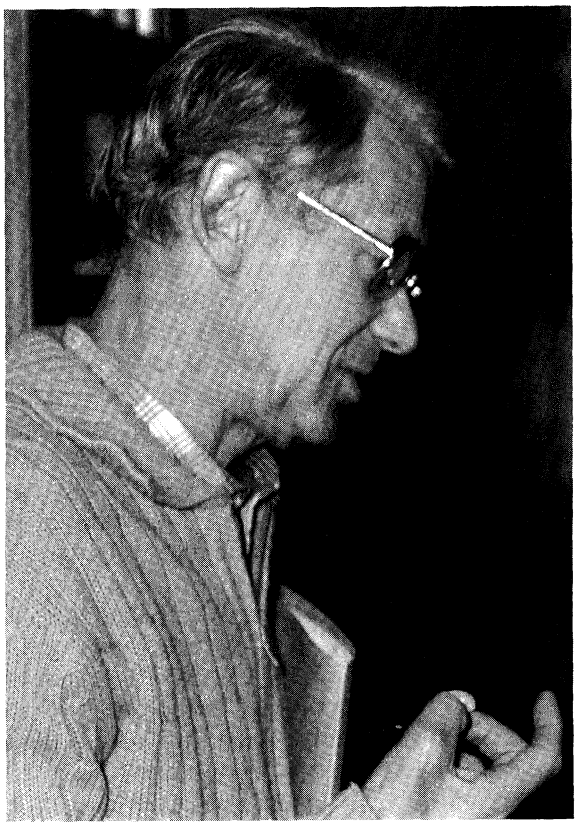

Kurt Symanzik

Kurt Symanzik was born November 23, 1923 in Lyck, East Prussia. He grew up in Königsberg, but because of the war he could only begin to study physics at the age of 23, when he entered the Technical University of Munich. He shortly moved to Göttingen and became a student of Heisenberg. There Symanzik encountered two young colleagues, H. Lehmann and W. Zimmermann, with whom he developed both close friendship and scientific collaboration. This group was later dubbed the "Feldverein" by W. Pauli, when it had become an important influence in theoretical physics.

In 1954, Symanzik completed his doctoral thesis, "On the Schwinger functional in quantum field theory." The deep insights in this work and the technical skill in their implementation set the scene for a series of classic papers in diverse fields of theoretical physics; all these papers share conceptual clarity combined with overwhelming technical ability. The best known work from the period in Göttingen was the famous LSZ "reduction formula" to express scattering cross sections in terms of vacuum expectation values of quantum fields. Today this formula can be found in most books on elementary particles or quantum fields.

From 1955 to 1962, Symanzik worked in many departments in both the United States and in Europe, including the Institute for Advanced Study, the University

of Chicago, Göttingen, Hamburg, Stanford, Princeton, UCLA, and CERN. Two themes during this period were a study of dispersion relations and the analysis of how Green's functions reflect the many-particle structure of quantum fields.

In 1962, Symanzik accepted a professorship at the Courant Institute, where he remained for 6 years. While there he developed Euclidean quantum field theory, surely one of his greatest achievements. He recognized that field theory could be reduced to the structure of classical statistical mechanics. He proposed that integral equations, correlation inequalities, Markovian properties, interacting random paths, and other aspects of classical statistical physics had an interpretation in quantum field theory. Originally Symanzik was motivated by his attempt to solve the existence question for scalar quantum fields by this method, culminating in his 1968 Varenna lectures. Later these ideas led to the reconstruction theorem for quantum theory from Euclidean fields, and they became an integral part of constructive field theory. Ultimately this approach made possible the computations based on high temperature series or computer simulation in lattice gauge theories based on the renormalization group. Furthermore this point of view led to the noninteraction theorems for quartic scalar field theories. Euclidean field theory today is an indispensible starting point for the study of many problems in particle physics.

In 1968, Symanzik returned to Germany as a research Professor at DESY. Here his interests turned in a different direction, and the Callan-Symanzik equation was another high point of his career. This renormalization group equation gave impetus to the discovery of asymptotically free quantum field theories. Symanzik found a first model. Soon thereafter it was recognized that nonabelian gauge theories are asymptotically free. This was a precondition for the development of Quantum Chromodynamics, the currently accepted model for hadronic interactions.

In 1981 the German Physical Society presented Kurt Symanzik the Max Planck Medal, its highest honor for scientific achievement.

For many colleagues and young scientists, Symanzik was a physicist whom one visited in order to learn by conversation. His shyness, his penetrating insight, and his dislike for redundancy in communication often made it difficult to establish personal contact with him. But those who did get to know him closely remember not only an extraordinary intellect, but also a loyal and generous friend. He enjoyed contacts with colleagues and young scientists both at DESY and elsewhere. It was usual for Symanzik to perform long calculations and to write long letters to encourage the work of others as well as to explain his own unique and original insights.

He enjoyed with equal gusto unscientific activities including swimming, attending ballet and dancing. Friends and colleagues watched with amusement and affection as he tried to execute dance steps as complicated as the equations in his papers!

Kurt Symanzik's last papers were devoted to lattice gauge theory. They show that he was in full command of his creative force until the end when he died of cancer on October 25, 1983.

A. Jaffe, H. Lehmann, and G. Mack

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