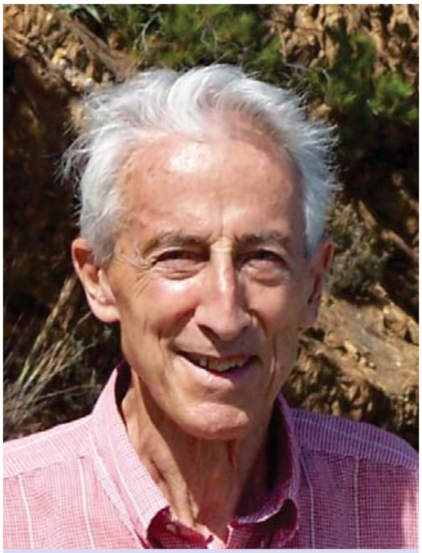
To notify the community about a colleague's death, subscribers can visit http://www.physicstoday.org/obituaries, where they can submit obituaries (up to 750 words), comments, and reminiscences. Each month recently posted material will be summarized here, in print. Select online obituaries will later appear in print.

Martin Charles Gutzwiller


Martin Charles Gutzwiller

Martin Charles Gutzwiller passed away on 3 March 2014 in Rio Rancho, New Mexico, where he had spent the last two years of his life in close proximity to one of his daughters. His name will remain graven in the history of theoretical physics, through both his trace formula and his wavefunction. Those who knew him will remember his deep and passionate dedication to science, his lucid mind, and his eagerness to communicate his ideas.

Born on 12 October 1925 in Basel, Switzerland, Martin spent his childhood partly in Fribourg and partly in Heidelberg, Germany. He received his diploma in physics from ETH Zürich in 1950; his thesis, "On the magnetic moment of nucleons in the vector-meson theory," was supervised by Wolfgang Pauli. Several decades later, in a letter to PHYSICS TODAY (August 1994, page 9), Martin recognized having received "a marvelous education in early field theory" but at the same time having been frustrated because the problem posed by Pauli could not be satisfactorily handled. He proceeded to criticize theoretical physicists as having lost any touch with reality. Thus he pleaded for coming back to "down-to-earth physics" instead of "chasing an elusive goal on the basis of abstract models."

After receiving his diploma, Martin spent a year at Brown Boveri (now ABB) in Baden, where he helped set up the first microwave telephone link in Switzerland, between Zürich and Geneva. In 1951 he moved to the US on a scholarship and studied for his PhD at the University of Kansas under the supervision of Max Dresden. Two years later he finished his thesis, "Quantum theory of wave fields in spaces of constant negative curvature." He then joined Shell Oil's exploration and production research laboratory in Houston, Texas, to conduct research on plastic flow of rocks under high pressure, sound propagation in solids, and magnetization of sedimentary rocks.

In 1960 Martin returned to Switzerland to be a researcher at the IBM Zürich Research Laboratory. Three years later he moved to New York City to work for the IBM Watson Laboratory at Columbia University, where he also was an adjunct professor in metallurgy. Martin moved with the lab, now the Thomas J. Watson Research Center, to Yorktown Heights in 1970. After retiring from IBM in 1993, he became an adjunct physics professor at Yale University.

Martin launched one of his great innovations, the Gutzwiller wavefunction, while at IBM in Zürich. Following up on his investigation of the magnetization of rocks, he wanted to better understand the electronic origin of magnetism in solids. To that end he wrote a variational *ansatz* for the ground-state wavefunction of electrons in a crystal that are moving from one unit cell to the next while mutually coupled by the strongly screened Coulomb repulsion.

Specifically, Martin considered a Hamiltonian, now referred to as a Hubbard model, for electrons that hop between the sites of a regular lattice and interact only when two of them—with opposite spin, as required by the Pauli principle—meet at the same site. Martin was able to incorporate the complicated local correlations among electrons within a simple operator that acts on the filled Fermi sea. In three papers published between 1963 and 1965, he also devised an ingenious way of treating his variational *ansatz* in an approximate but surprisingly robust way. The Gutzwiller wavefunction is still used to describe numerous phenomena in solid-state physics, such as band ferromagnetism, the Mott metal–insulator transition, bond alternation in conjugated polymers, and unconventional superconductivity.

A participant in several Sanibel Symposia organized by Per-Olov Löwdin in Florida, Martin was inspired to explore the connection between classical and quantum mechanics. He addressed the question of how bound trajectories of particles in a classical system were related to the discrete energy spectrum that the corresponding system would have in quantum physics.

The first three papers Martin published on that topic were virtuoso technical advances on ideas already in circulation, but the fourth, published in 1971, broke fundamentally new ground. In classical nonintegrable systems, most orbits never close on themselves. With wonderful insight, Martin realized that the spectrum of quantum energies depends only on the special class of periodic orbits. Moreover, he provided a precise formula for the connection between classical closed orbits and the quantum energy spectrum, the celebrated Gutzwiller trace formula, which became a central analytical tool when quantum chaos came into sharp focus in the mid 1970s.

Martin ignored scientific fashions. What made him so attractive as a scientist is that he refused to follow *any* fashion; instead, he generated ideas that became the fashion. Rather than endlessly collaborating and, as we are now encouraged to do, promoting what we do, Martin was thinking thoroughly and deeply, often with scholarly delving into the remote scientific past, into literature others might think obscure or irrelevant, and publishing only when he was ready. He followed the motto of mathematician Carl Friedrich Gauss when it came to publishing his results: "Few, but ripe." Martin was a quiet man who did not need to shout.

Dionys Baeriswyl
University of Fribourg
Fribourg, Switzerland
International Institute of Physics
Natal, Brazil
Michael Berry
University of Bristol
Bristol, UK
Dieter Vollhardt
University of Augsburg
Augsburg, Germany ■