

Il'ya Abramovich Malkin (Obituary)

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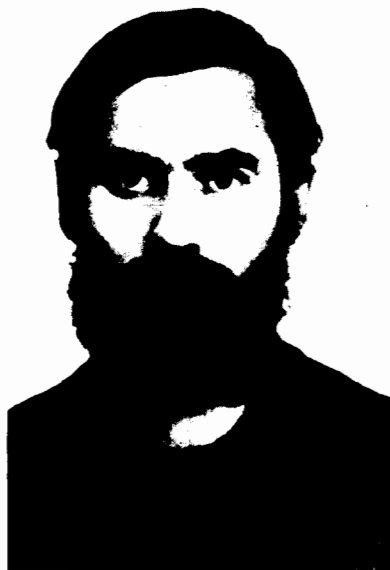
Il'ya Abramovich Malkin, talented theoretical physicist and outstanding teacher, perished tragically on April 13, 1982. He accomplished much during his short lifetime, leaving his mark on science and in the memory of those who knew him.

Malkin was born on August 4, 1940 in Moscow. In 1957, he entered the Moscow Physicotechnical Institute (MFTI) at which he first studied and then took the position of Docent in the Department of Theoretical Physics that he held nearly to the end of his life. Malkin defended his Candidate's Dissertation in 1969, and had recently completed preparation of his Doctorate thesis. While still a student, he passed L. D. Landau's "theoretical minimum" examinations and, under the guidance of V. B. Berestetskii, embarked on a study of the polarization properties of photons. The range of Malkin's interests was forming even in this early project: applications of the methods of symmetry theory and group theory to physical problems.

Development of the theory of the dynamic symmetries of quantum systems, and nonstationary systems in particular, and the application of this theory to a broad range of physical problems came to be Malkin's chief contribution to theoretical physics. The dynamic-symmetry concept made it possible not only to explain the degeneration of quantum-system levels corresponding to latent symmetry, e.g., the Fock symmetry of the four-dimensional rotation group, which accounts for the "accidental" degeneracy of the energy levels of the hydrogen atom, but also to unify the entire energy-level spectrum into a single irreducible dynamic-group representation, e.g., for the hydrogen atom, a conformal-mapping group that generalizes the Fock latent symmetry. A series of studies in this area revealed characteristic aspects of Malkin's endowment—depth and clarity of logical analysis combined with the ability to apply subtle mathematical methods in solving physical problems.

Largely owing to Malkin's work, dynamic-symmetry methods have become accessible to a broad range of physicists. This was made possible in part by the monograph "Dynamic Symmetry and Coherent States of Quantum Systems," which he co-authored with V. I. Man'ko and is the world's only text on the problem, and in part by his student textbooks.

Malkin's breadth and versatility enabled him to work and produce interesting results of fundamental and applied nature in a variety of fields in theoretical physics and mathematics, such as the theory of molecular spectra (the vibron structure of the spectra of polyatomic molecules), the theory of the statistical properties of laser radiation in randomly inhomogeneous media, solution of nonstationary problems in quantum mechanics,



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including the problem of charge motion in alternating electromagnetic fields, and the theory of special functions (addition formulas for multidimensional Hermitian polynomials).

One of Malkin's outstanding character traits was his dedication. Everything that he did was done with complete commitment and no sparing of time or effort. This held equally for his scientific occupations and his teaching activity. Malkin consistently strove for perfect clarity in his exposition of the most difficult and subtle theoretical problems. Many generations of MFTI students who studied under Malkin will remember with gratitude the brilliant and tightly structured lectures and seminar presentations, permeated with his passionate dedication to science, and the benevolent firmness of their teacher.

Malkin's contribution to science does not end with his scientific papers (of which about a hundred were published). He was an attentive listener and a gentle critic. The works of many of the physicists who were associated with him bear the imprint of his thoughts, ideas, and temperament.

The life of Il'ya Abramovich Malkin was one of selfless devotion to science, and his memory will forever remain a bright one for everyone who associated and worked with him.

Translated by R. W. Bowers