

research, and remaining active in AVS thin-film and surface-science organizations, until his activities became increasingly limited by his illness.

Over the course of his academic career, Dick was a thesis adviser and mentor for more than 50 graduate students. He stressed the importance of an intuitive approach to teaching and its relevance to emerging technology needs and career opportunities. In 1967, he received the Strosacker Award for Excellence in Teaching.

Dick also was particularly active as a member and chairman or program chairman in the thin film, surface science, and applied surface science divisions of AVS. He was elected president of AVS in 1976 and was named an honorary member of the society in 1995.

One of us (Lee) recalled an excursion along the C&O Canal, which runs from Washington, DC, to Cumberland, Maryland, that captured Dick's character very well:

Clearly bored by the gentle slope of the towpath, Dick began inspecting the steep, forested slope on the other side of the canal.

"There must be a path up there," he declared.

An hour and a half later, sweaty, lacerated, and accompanied by two exhausted wives, we had determined that there was not.

As with Dick's science, in which he often did find a more interesting path, he had led us over unknown ground to show us vistas we would not otherwise have seen.

Bird watching and hiking were Dick's favorite pastimes. But most of all, canoeing, camping, and fishing trips with his family and friends in Quetico Provincial Park in Western Ontario, Canada, were highlights of his life.

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Leonid Moiseevich Ozernoy

Leonid Moiseevich Ozernoy, widely known for his research on high-energy astrophysics, died of colon cancer on 28 February 2002 in University Park, Maryland.

Ozernoy was born in Moscow on



LEONID MOISEEVICH OZERNOY

19 May 1939. In 1963, he received his master's degree in astronomy, graduating from Moscow State University with top honors, which ensured him a position as a postgraduate researcher at the P. N. Lebedev Physics Institute in Moscow.

In 1964, when Ozernoy was a graduate student, he and his PhD supervisor, Vitaly Ginzburg, pioneered the study of magnetohydrodynamic phenomena in collapsing bodies. In their outstanding paper (which received first prize from the All-Moscow Conference of Young Scientists in 1964), they considered the variation of a star's magnetic field when the stellar radius approaches the Schwarzschild radius and established the absence of magnetic fields of black holes.

In 1965, Ozernoy considered the gravitational radiation from a supernova and suggested measurability of that radiation. At the same time, he pioneered the analysis of the heating and cooling processes in the expanding intergalactic gas. He received a PhD in physics and mathematics in 1966; his thesis topic was gravitational condensation in the intergalactic medium.

Ozernoy joined the I. E. Tamm department of theoretical physics at the Lebedev Institute in 1966, and remained there until his emigration from the USSR to the US in 1986. During the 1960s, he began his work on the nature of the quasars discovered a few years earlier by Caltech's Maarten Schmidt. He proposed supermassive, fast-rotating, strongly magnetized stars (spinars) as a source of activity of quasars and galactic nuclei and performed a detailed analysis of the structure, electrodynamics, evolution, and observational tests of

spinars. One of the basic problems of quasars was whether each was a single body or a system of many objects. Ozernoy statistically analyzed the optical variability of quasars and established that quasars are single bodies rather than ensembles of many independent objects.

In 1971, Ozernoy received the Full Doctor of Science degree in physics and mathematics from Moscow State University for his outstanding study of quasars and galactic nuclei.

The vastness of Ozernoy's scientific interests was extraordinary. He probably was one of the last "encyclopedists" in astronomy—the author of many ideas and hypotheses on different topics. Although not all of his predictions have been confirmed, some of them have turned out to be prophetic. For example, in 1977, he argued that radio-quiet gamma-ray pulsars may exist, but also suggested that some unidentified gamma-ray sources are pulsars. Many years later, in 1994, Hans Mayer-Hasselwander and colleagues confirmed this prediction by showing that the most powerful unidentified gamma-ray source, Geminga, is indeed a pulsar.

Another example of Ozernoy's successful predictions involved his work to support the kinematic results (in 1991) of John Lacy and colleagues on the formation of a one-armed spiral structure (as a part of the visible minispiral) in the central disk of our galaxy. Ozernoy hypothesized that an instability (in the 2-parsec-sized central disk) existed as the generator of this one-armed spiral. Theoretical (analytical and numerical) investigations and the analysis of the observational data of the central area fully confirmed Ozernoy's hypothesis. As it turned out, the instability he predicted was a nontrivial overreflection instability that is generated by a kink in the central disk's rotation velocity—the transition from a prolonged area of constant velocity to an area of higher Keplerian velocity in the vicinity of a massive black hole in the center of the Galaxy.

The scientific council of the Lebedev Institute's department of theoretical physics nominated Ozernoy in 1979 as a corresponding member of the USSR Academy of Sciences. He, however, declined the nomination because he had already decided to emigrate to the US with his family—Harvard University had invited him to work at the university as a visiting scholar.

Although Ozernoy was a theoretician by education, his knowledge of

observational data and methods was amazingly precise and profound. But, to widely use the observational data, he needed firsthand scientific information. In those times, there was no e-mail, and the postal mail was further delayed (by a month to six months) by the obligatory KGB scrutiny. For a Soviet scientist, those circumstances made any joint work with Western colleagues difficult, and the Soviet government only rarely allowed visits to foreign countries. The year of the Harvard invitation, Soviet authorities denied Ozernoy and his family the right to emigrate from the Soviet Union. Ozernoy continued to work in the theoretical physics department of the Lebedev Institute.

Seven years of hardship, harassment, and struggle followed, during which Ozernoy went on a hunger strike three times. Those were years of bitter disappointments, and possibly the hardest in his life. Some people who were keen on making friends with him at the peak of his Soviet career began avoiding any contact with him—he was labeled a dissenter. But during these same years, his remarkable qualities of valor and honesty, for which he was admired, appreciated, and loved by his closest friends, had the chance to manifest themselves most clearly.

Ozernoy and his family eventually did immigrate to the US, in 1986. He held positions at Boston University, Harvard, Los Alamos National Laboratory, NASA's Goddard Space Flight Center in Greenbelt, Maryland, and George Mason University in Virginia, where he became a full professor of physics and computational sciences in 2000.

In addition to his work on the frontiers of astrophysics, Ozernoy (known as "L. M." to his students) was a lucid, inspiring teacher. One of us (Usov) was privileged to be among the first of his students. Ozernoy believed in describing research projects in broad terms so that his students were obliged to work out their own scientific interests.

Ozernoy will be remembered as a man of extraordinary scientific skills and an eminent teacher. Those who had the privilege to be his colleagues and friends will keep a most pleasant and rewarding memory of him.

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