

west, he accepted an appointment as research professor at Southern Illinois University in Carbondale where he remained very active for the next six years in teaching, research and in organizing a series of conferences on topics related to the applications of science.

The years in Mendocino County were as fully active as any in Marshall's life. In addition to continuing links with the Lawrence Livermore Laboratory, he became involved in community affairs ranging from a role of leadership in development of a rural transit authority to one of promoting basic studies in seacoast and timber management.

Marshall was born of missionary parents in Canton, China in 1902 and spent his pre-college years in the Western Pacific. This formative period, amid diverse peoples and cultures, provided him with an unusually broad capacity to work with individuals from many walks of life. He had a circle of devoted friends with whom he shared his numerous interests.

FREDERICK SEITZ
The Rockefeller University

James R. Macdonald

James Robert Macdonald died at the age of 43 on 12 December 1979 while participating in a session of the APS Division of Electron and Atomic Physics Meeting in Houston, Texas. His sudden, unexpected death is felt deeply throughout the international community of physics, particularly by those engaged in research on atomic collisions and by those of us who knew him as an ebullient friend of seemingly boundless energy.

Macdonald was born in Toronto, Canada, receiving his BA degree in 1958 from the University of Toronto, and was a secondary-school teacher in Toronto from 1958 to 1962. He entered McMaster University in 1962 and was awarded a MSc degree in 1964 and a PhD in physics in 1966. He continued his research in physics as a National Research Council Fellow at the Niels Bohr Institute from 1966 through 1968. He joined the department of physics at Kansas State University in 1968 and earned the rank of professor by 1975.

Macdonald made significant contributions in atomic physics through experimental electron and atomic collision studies and in the development of the equipment and techniques used for such studies. He had the foresight to recognize the unusual opportunities offered by nuclear accelerators as sources for the study of atomic collisions using heavy-ion, high energy projectiles. He and his students pioneered many techniques for determining atomic cross sections using methods of charge analysis, x-ray and Auger analysis, and coincidence techniques. He was among the first to point

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obituaries

out the very large projectile charge-state dependence of atomic collision processes. It was the initial research of Macdonald that provided the impetus for the development of a full-scale accelerator-based atomic physics program at Kansas State.

His research was consistently distinguished by originality and by thoroughness. Because his experimental studies were generally theoretically motivated, the results consequently had a large impact on the field of atomic collisions and formed the basis on which many others have built.

As fruitful as were his research efforts, there was another side of Macdonald that was known primarily to those who worked with him on a day-to-day basis. His desire to seek knowledge was complemented by his desire to share knowledge, to teach. He demanded the right to teach at the freshman-sophomore level where he could encounter non-science majors, for he firmly believed that in order for science to remain a valued part of our society it must be appreciated by all educated persons. Many desire to teach, but few deserve the title teacher so well as did James Macdonald. For those of us who encountered him, though his life was too brief, it was a privilege, for we did learn much from him.

C. E. HATHAWAY

Kansas State University

David W. Koopman

David W. Koopman, research professor of physics in the Institute for Physical Science and Technology at the University of Maryland, died on 21 December at the age of 44.

His research activities were concentrated at the interface between atomic processes and plasma phenomena. Prior to 1970, Koopman's principal interests were ion collision processes, including charge exchange by multiply-charged ions, and quantitative atomic spectroscopy using a shock tube as a light source. More recently, Koopman directed his studies towards plasma phenomena, laser applications, and problems of controlled fusion.

Koopman received a BA in physics from Amherst College in 1957 followed by MS (1959) and PhD (1964) degrees in physics from the University of Michigan at Ann Arbor, where he was a research student of the late Otto Laporte. He then joined the Maryland faculty in the Institute for Fluid Dynamics and Applied Mathematics which is now the Institute for Physical Science and Technology. Koopman was promoted to full research professor in 1973. During his 15 years at Maryland he directed the work of five