# obituaries

## Jun John Sakurai

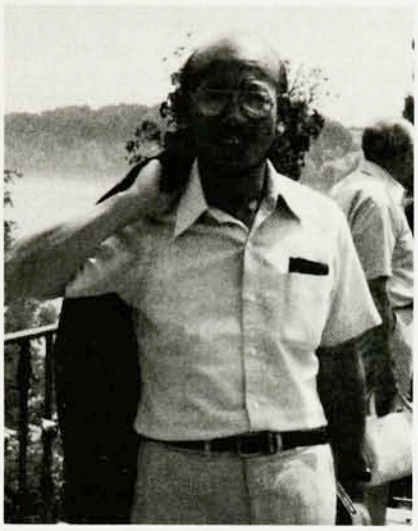
Jun John Sakurai, noted theorist in particle physics, met an untimely death at the age of 49 while he was visiting CERN in Geneva last October. Sakurai was born in 1933 in Tokyo. In 1949 he came to the United States as a high-school student. He went on to Harvard, then to Cornell, received his PhD in 1958, and was appointed assistant professor at the University of Chicago, which became the base for his activity for the next twelve years. In 1970 he moved to the University of California at Los Angeles, and he remained there until his death.

When Sakurai was still a graduate student, he proposed what is now known as the V-A theory of weak interactions, independently of (and simultaneously with) Richard Feynman, Murray Gell-Mann, Robert Marshak and E. C. G. Sudarshan. In 1960 he published in *Annals of Physics* a paper that was prophetic and probably his single most important paper. It was concerned with the first serious attempt to construct a theory of strong interactions based on Abelian and non-Abelian (Yang–Mills) gauge invariance. Essentially it was an $SU(2)\times U(1)\times U(1)$ (isospin, hypercharge and baryonic charge) gauge theory applied, alas, to the strong flavor interactions, before the time when the flavor SU(3) emerged as the relevant symmetry of hadrons.

Nowadays we do not regard flavor as a gauged symmetry that governs strong interactions. But the impact of Sakurai's paper was considerable in those days. It induced theorists to attempt to understand the mechanisms of mass generation for gauge (vector) fields. It gave them the stimulus to search for a realistic unification of forces under the gauge principle. As it happened, the first fruits of these theoretical endeavors were to be realized in the realm of weak interactions.

On the phenomenological side, Sakurai vigorously advocated and pursued the vector meson dominance model of hadron dynamics. For example, he was the first to discuss the mixing of $\omega$ and $\phi$ states. In fact, he made numerous important contributions to particle physics phenomenology in a much more general sense, as his heart was always close to experimental activities. A lucid and popular expositor, he also benefited the physics community with his lectures, reviews and books.

It seems appropriate to include a quotation from his 1960 paper: "Why has nobody tried this kind [gauge theory] of interaction before? Perhaps our theory might have been tried a long time ago if it were not for the fact that the conventional Yukawa-type explanations of low-energy—phenomena—have been so successful."



SAKURAI

In order to perpetuate Sakurai's contributions to science, a J. J. Sakurai Memorial Fund is now being planned at UCLA.

YOICHIRO NAMBU
*Enrico Fermi Institute*

## William E. Krag

William E. Krag, member of the technical staff at MIT, Lincoln Laboratory, died of cancer on 26 August at the age of 54.

Krag received both a bachelor's degree and a PhD from MIT. His doctoral study on the magneto-transport properties of silicon was one of the first careful correlations of those properties with band structure.

After the completion of his PhD, he continued to work at Lincoln Lab on fundamental properties of semiconductors, mainly on infrared spectroscopy. He recognized the potential of computers for experimental research early, and some 15 years ago had designed and built an on-line computerized system for taking and reducing his spectroscopic data. Krag's low-temperature spectroscopy studies of impurities in semiconductors under calibrated stress were a model of experimental elegance. He participated in an important way in some of the earliest work on the emission characteristics of semiconductor lasers.

More recently, the focus of Krag's work shifted to applications. He pursued research and development of solid-state rf amplifiers and low-intensity