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Obituary of Kazumi Maki

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Kazumi Maki, one of the most prolific solid-state theorists of the last four decades, died on September 10, 2008 in Los Angeles.

Kazumi was born on January 27, 1936, in Takamatsu, Japan. His wife Masako remembers that ”he was very proud to have the same birthday as his beloved Mozart”. He spent most part of his childhood in Kyoto except during World War II when the family had to move to the countryside. He studied theoretical particle physics at the University of Kyoto, joining Hideki Yukawa's group for his Ph.D. thesis, which he finished in 1964. This was followed by a one-year postdoctoral position at the University of Chicago. After two years as an assistant professor at UC San Diego, Kazumi became professor at Tohoku University in Sendai in 1967 at the early age of 31, a position he kept until 1974. In 1974 he accepted a professorship at the University of Southern California, where he remained until his death.

Apart from three early papers on quantum field theory, Kazumi's research focused on solid-state physics. He made seminal contributions to several fields, above all to superconductivity, superfluid ^{3}He, and quasi-one-dimensional (1D) materials. About half of his roughly 500 publications deal with superconductivity. They appeared in two distinct periods, an early ”Bardeen, Cooper and Schrieffer (BCS) period” (1961-1972) and a late ”High temperature superconductivity (HTS) period” (1991-2008). When he started to work on superconductivity, BCS theory was still quite new and therefore offered a rich playground for a young researcher. Kazumi quickly became a virtuoso in BCS theory. His most famous contribution during the early period is the discovery of an anomalous enhancement of the normal electrical conductivity due to superconducting fluctuations just above the critical temperature (1968). This effect is due to a term in perturbation theory which is now called ”Maki-Thompson term”. Furthermore, he extensively studied the problem of pair breaking and the concomitant zero gap superconductivity and contributed a well-known review paper on that topic to Ronald Parks' two-volume standard reference on superconductivity (1969). Kazumi's contributions during the HTS period address the effects of anisotropic order parameters on transport and magnetic properties, both in the superconducting state and in the pseudogap phase, which he viewed as an unconventional spin-density wave. As he pointed out early on, due to the growing evidence for *d*-wave pairing the problem of pair breaking receives a new twist, as non-magnetic impurities produce much stronger effects in a superconductor with nodes than in a conventional *s*-wave superconductor.

Towards the end of his career, Kazumi also became an enthusiastic proponent of the ideas of gossamer superconductivity and half-integer flux quanta in unconventional superconductors. During the intermediate time span (1973-1990), Kazumi focused on superfluid ^{3}He and on quasi-1D materials. Shortly after the discovery of new phases in the fermionic quantum liquid ^{3}He below 2.7 mK and their identification as anisotropic (*p*-wave) superfluids, he started to investigate the unusually rich excitation scenario in these phases. Superfluid ^{3}He became his main research field during the subsequent 12 years, and he shared his insight with several Ph.D. students and senior collaborators.

In particular, Kazumi showed that this anisotropic superfluid exhibits various types of solitons in the form of specific spatial textures of the order parameter. His subsequent work on quasi-1D materials includes such diverse topics as the collective transport mediated by charge-density wave motion in $NbSe_3$ in the blue bronze, the thermodynamics of field-induced spin-density waves in the Bechgaard salts and the search for signatures of charged and neutral kink solitons in polyacetylene.

Kazumi's theoretical achievements were widely recognized. During his career he received numerous honors and awards, in particular the Nishina Memorial Prize (1972) and the John Bardeen Prize (2006).

Kazumi had a colorful personality and a profound intellectual curiosity spanning many subjects, including cooking, literature, the arts, and music. In particular, he loved to sing and play the violin, especially works by Schubert and Mozart. Due to his great productivity in theoretical physics and his annual extended journeys around the world Kazumi was very well known in the condensed matter community. He never shied away from a passionate discussion, especially when it involved superconductivity or Italian cuisine.

His originality was deeply rooted in his sense of personal freedom, which was reflected in his independence of other people's opinions and in his mistrust of authorities and social norms. The Californian way of life helped him to keep his principles. The scientific community loses a great researcher with a very original personality, and many of us lose a good friend.