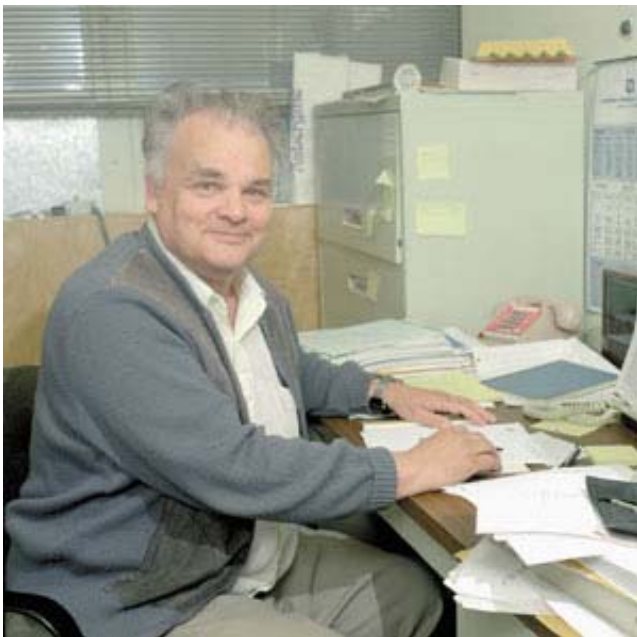

Klaus Halbach (1925-2000)

Revered Magnet and Accelerator Design Expert, Dies May 19, 2000

By Lynn Yarris, lyarris@lbl.gov

Klaus Halbach, a Berkeley Lab physicist with the Engineering Division, whose design and development of periodic permanent magnetic structures called “insertion devices” opened the doors for the Advanced Light Source and subsequent third-generation synchrotron radiation facilities, died on May 11 at his home in Berkeley following a long battle with prostate cancer. He was 75.



In 1995, a “Halbach Symposium on Magnet Technology” held at the ALS drew more than 100 participants from around the world. Two of the principal organizers of that symposium were Berkeley Lab’s Brian Kincaid and Ross Schlueter.

“Klaus was instrumental in convincing me to leave Bell Labs in 1988 to come here to work on the ALS,” said Kincaid. “In addition to having a major influence on accelerator physics

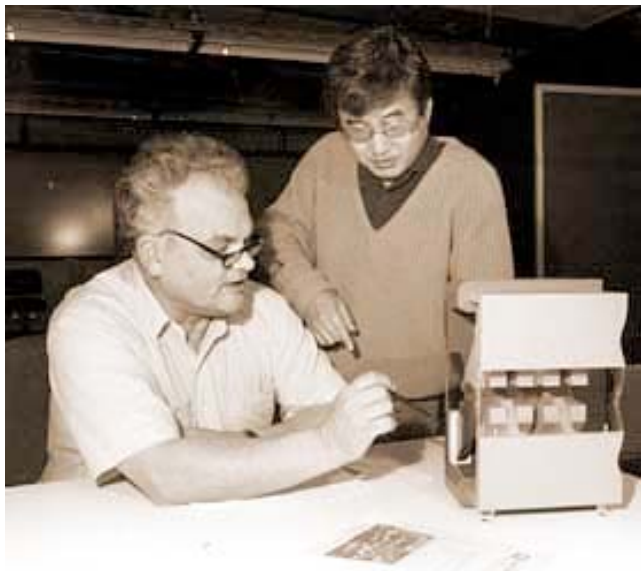
worldwide, he was my friend, teacher and mentor for 18 years. I miss him.”

Said Schlueter, “He exuded the enthusiasm of a little boy continually making new discoveries, and he relived his excitement each time he was able to bring a colleague to see the beauty and simplicity in his world of the conformally-transformed plane where he habitually thought and worked.”

A native of Germany, Halbach received his Ph.D. in physics at the University of Basel in Switzerland and came to the United States in 1957 to work at Stanford University with the great nuclear magnetic resonance pioneer Felix Bloch. Following a short return to Switzerland to start a plasma physics group, he joined the plasma physics group at Berkeley Lab in 1960. His work in this field led him into accelerator design, and he was a major contributor to the Omnitron, a proposed synchrotron that would have accelerated nuclei of all 92 elements from hydrogen to uranium. Although never built, the Omnitron’s design laid the groundwork for the Bevalac.

For all his success as an accelerator designer, Halbach is best known for his later work on magnetic systems for particle accelerators. He and Ron Holsinger, a Berkeley Lab engineer and later Halbach’s son-in-law, created the famous POISSON package of computer codes for magnetic system design, still in use today. Halbach went on to become one of the world’s premier designers and developers of permanent magnets for use as insertion devices — wigglers and undulators — in synchrotron light sources and free electron lasers.

Unlike electromagnets, Halbach's permanent magnet — steel hybrids required neither expensive electrical power nor space-consuming coils to produce powerful magnetic fields. Consequently, these magnets could be made small enough to fit inside the tight confines of an electron storage ring. Halbach also designed electromagnet dipole, quadrupole and sextupole magnets to bend and focus the ALS storage ring beam.



Klaus Halbach with Kwan-Je Kim discussing undulator model that Halbach designed — 1986

As a world authority on the design of magnetic systems, Halbach was a consultant to accelerator projects and synchrotron light sources around the world, including the Advanced Photon Source at Argonne and the Stanford Synchrotron Radiation Laboratory. All of the premier radiation sources within these machines depend upon the permanent magnet technology now known as the Halbach Array.



Argonne National Laboratory, Advanced Photon Source: Sam Shanin, Jim Humbert, Tony Gorski, Sushil Sharma and Klaus Halbach

Although he officially retired from Berkeley Lab in 1991, Halbach continued to work on magnet design and trained numerous students in his field. He made contributions to such diverse projects as magnets for a miniature cyclotron that could be used for medical radioisotope production, magnets and low-friction magnetic bearings for an electromechanical battery, and the design of miniature permanent magnet NMR spectrometers for future Mars lander missions. The ALS now gives out an annual award to recognize excellence in instrumentation design and development called the Klaus Halbach Award.

Halbach is survived by his wife of 55 years, Ruth, daughter Terry, and three grandchildren. A memorial service will be held on June 28 at 3 PM in the Brazilian Room in Tilden Park. Contributions may be made to the

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