Karl Brown
1925 – 2002

Accelerator pioneer Karl Brown died on 29 August in Stanford, California, where he had spent most of his working life. Professor emeritus of applied research at the Stanford Linear Accelerator Center (SLAC), Brown pioneered the development of linear accelerators for research, as well as for cancer treatment.

Brown attended the University of Utah as an electrical engineering student, but in 1946 he transferred to Stanford to work on particle accelerators. This move was the beginning of a Stanford career spanning more than half a century. He earned his doctorate in 1953 for the commissioning of the Mark II accelerator, following which he joined the Stanford physics department’s Hansen laboratories. In the early 1960s, when Wolfgang Panofsky conceived the idea for the Stanford linear accelerator, Brown became a member of the core team of young scientists who designed and built the 2 mile long accelerator under Panofsky’s direction.

In 1958, Brown was the first to use matrix algebra to calculate magnetic-optical aberrations in charged particle spectrometers, used by physicists for the precise analysis of nuclear and subnuclear structure. He developed a computer code called TRANSPORT to facilitate the equipment design process. This code later became a tool used worldwide to design spectrometers, beamlines and accelerators ranging in energies up to 1 TeV.

Brown also introduced the use of sextupole magnets to enhance the performance of spectrometers at SLAC. In the 1960s, he proposed making a colliding beam machine using two linear accelerators at SLAC. Later, he designed achromatic magnetic optical systems, which focus beams largely independent of their energies. His designs made it possible to achieve beam spots of a micron or less. They found application in particle colliders as well as in medical diagnosis and treatment. Travelling worldwide to assist in design of spectrometers and beam transport systems, Brown took sabbaticals in 1959 at Orsay in France, from 1972 to 1973 at CERN to work on the SPS and LEP and from 1992 to 1994 at the ill-fated Superconducting Super Collider in Texas.

Though internationally renowned as an expert in beam optics for spectrometers and high-energy particle accelerators, Brown’s greatest satisfaction came from his contributions toward the development of small linear accelerators for radiation therapy. As a graduate student in the 1950s, he was part of a small research team at Stanford that designed the first linear accelerator in the US to be used successfully to treat a cancer patient. In the late 1960s, Brown initiated and led the development by Varian Associates of the first commercially successful line of such machines, the CLINAC series. The present-day incarnation of the CLINAC treats more than 100,000 patients a day worldwide.

A fellow of the American Physical Society, Brown was awarded the 1989 prize for achievement in accelerator physics and technology by the US Particle Accelerator School.

“He is probably best known internationally for his development of the programs which make it possible to easily trace the path of particles through complex magnetic beam transport systems,” said long-time friend Panofsky. “However, his contributions go well beyond that, and we all are extremely sad about his passing.”