Christoph Schmelzer 1908–2001

Christoph Schmelzer, one of the pioneers of German particle accelerators and of CERN, a founding father of the GSI Darmstadt laboratory and from 1969 to 1979 its first scientific director, died on 10 June in Heidelberg at the age of 92.

Born in Lichtentanne, Saxony, and schooled in Zwickau, Schmelzer began his university studies at Munich's Technische Hochschule, initially in chemistry, before switching subject and university to study physics at Jena, where he submitted his thesis on high-frequency measurements in 1935.

After a short time at Jena as assistant to Max Wien, Schmelzer went to the US, but had to return in 1939, working until 1945 with Georg Goubeau in Jena on 10 cm wavelength physics and technology. In 1948 he became Walther Bothe's assistant in Heidelberg. In 1952 he turned his attention to particle accelerators at the time when the idea of CERN as a major European laboratory was being launched, becoming a key member of the group designing – and eventually building – the Proton Synchrotron (PS), which was then one of the world's two highest-energy accelerators.

From 1954 to the end of construction, Schmelzer served as deputy to PS Division leader John Adams. However, he is best remembered as the creator and inspiring leader of the group responsible for the PS radiofrequency acceleration system.

The construction of the world's first large alternating gradient accelerator, controlled by beam feedback, was new scientific territory, calling for imaginative new radiofrequency techniques, and many experts doubted that the result would be successful. The accelerating frequency had to follow a nonlinear function of the magnetic guide field with a precision that could not possibly be achieved by external programming. Moreover, a potentially fatal transition energy in mid-acceleration, at which the synchronous phase jumps from one side of the accelerating wave to the other, had to be overcome. Finally, precision frequency tracking of the feedback-tuned accelerating cavities was required. All of these problems were solved by the first application of multiple feedback systems, deriving their input from the beam itself. Schmelzer was one of the inventors of this new technology.

The 1959 commissioning of the PS was described by Robert Jungk in his book The Big Machine (1968 Scribners, New York). After documenting a series of headaches, Jungk continued: "hardly had this [latest] disorder been cured when an extremely complicated radiofrequency system, geared to high-speed switching within ten-thousandths of a second, acted up. The method of beam control, invented in Heidelberg, in which the acceleration of the proton beam is regulated by its own feedback signals, would not listen to reason, and its master, Christoph Schmelzer, ordinarily easygoing, for the first time showed a nervousness that not even his beloved beer could control."

However, soon afterwards, everything came together, and on 24 November 1959 the PS protons sailed through the critical transition energy barrier without difficulty and reached 24 GeV with a transmission factor of 90%.

In 1959, Schmelzer became professor of applied physics at Heidelberg. He pushed the establishment of the GSI heavy-ion laboratory, equipped with the UNILAC linear accelerator, which was formally founded in December 1969 with him as its first scientific director. He furthered the development of the laboratory's installations with a ring accelerator to reach higher energies. Thanks to his vision and wisdom, the GSI laboratory went on to become a world player in heavy-ion research.

Christoph Schmelzer was an honorary professor at Heidelberg and a member of the Heidelberg Academy of Science. In 1978 he was awarded the German Bundesverdeinsberle. He is remembered as a warm-hearted and modest man, and his death represents the loss of a leading figure in scientific research.

Jefferson Laboratory chief scientist and eminent theorist Nathan Isgur died on 23 July, aged 54. A tribute will follow in the next edition.