

# Bruno Ferretti 1913–2010

Bruno Ferretti, a leading figure in Italian and European physics and in the early days of CERN, passed away on 11 August aged 97. His research encompassed a vast spectrum of scientific interests, from experimental physics to fundamental theory.

Born and educated in Bologna, in 1937 Ferretti was invited by Enrico Fermi to join his group in Rome. When Fermi left for the US in 1938, Ferretti joined forces with the people in Rome who were pursuing research in fundamental physics, despite the hardships of the times. For a while he was the only senior theoretician, a responsibility that he took very seriously. He followed in detail all developments in the field, working out many of the answers for himself, and had an exceptional influence on the education of young theorists in Italy. (On leaving, Fermi had suggested that Ferretti should take charge of lecturing in his place.) He was also a beacon for experimental physicists, listening to them and then discussing their problems in depth, often suggesting the experimental touches that would make a measurement a success and ensure its significance.

Ferretti became a full professor at Milan University in 1947 and then at Rome in 1948. It was at the Physics Institute in Rome that he worked with Edoardo Amaldi on ideas for what was to become CERN. In December 1950, at a meeting called by Pierre Auger in the headquarters of the Centre européen de la culture promoted by Denis de Rougemont, Ferretti submitted to the group for scientific studies and research a concise proposal, including costs, for “a European nuclear physics laboratory based on a large accelerator of elementary particles” (in the words of the group’s resolution). This laid the foundations of the future CERN laboratory, fixing its direction in “basic science”.

CERN’s theory group was originally based



*Bruno Ferretti (centre) at the Solvay conference in 1948 with Felix Bloch (left), Homi J Bhabha (right) and Wolfgang Pauli (behind). (Courtesy Pauli Archive/CERN.)*

in Copenhagen, but in 1957, Ferretti became the first director of the Theoretical Studies Division in Geneva. During his time at CERN, the experimental programme for the 600 MeV Synchrocyclotron and the up-coming 25 GeV Proton Synchrotron was outlined, following wide consultation in the Member States and in many seminars at CERN. Then in April 1959 Markus Fierz took over as head of theory, and Ferretti returned to Bologna, where he held the chair of theoretical physics until his retirement in 1988.

Ferretti’s original interests were in cosmic rays, on which he worked with Gilberto Bernardini, Oreste Piccioni and Gian Carlo Wick, among others, and in classical electromagnetism. However his main interest, throughout his research work, was in field theory and its more fundamental problems.

He made profound contributions concerning the problem of macroscopic causality and its relation to Lorentz invariance, and he also made important remarks on the problem of renormalization. In his aim for clarity and precision he considered particularly the problem of the definition of the state and its relation to measurement in quantum electrodynamics. In a more pragmatic vein, he worked on the Dyson–Feynman approach and on indefinite metrics.

More recently, Ferretti focused on the question of indefiniteness in position, for which he was searching for the existence of minorants. In his last years, he was interested in measurements of gravitation, proposing an experiment with gravitational radiators and detectors.

In addition to his work on questions

in fundamental physics, Ferretti developed some more speculative ideas, such as a neutrino theory of light, and energy-dependent symmetries. He was also interested in areas other than field theory, for example in the physics of bremsstrahlung in crystals, and in some problems of statistical mechanics, particularly density fluctuations near criticality. In the field of high-energy phenomenology he worked on nuclear forces and on pion-nucleon scattering.

A taste for experimental and applied

physics being one of Ferretti's special characteristics, he studied the problems posed by nuclear energy and conceived of a new type of nuclear reactor. A prototype was built near Bologna, where Ferretti also laid the foundations for the School and Laboratories for Nuclear Engineering. Nor did he stop posing and answering questions related to the teaching of physics at any level and instigated original research in science education. He remained active and enthusiastic in research until his very last years, always deeply

convinced that theory should keep in touch with feasible measurements.

Ferretti was remarkable for his vast knowledge and discernment in many fields of physics, sometimes very different and widely separated. Discussions with him could last entire afternoons, and he was always well informed and rich in ideas. This was all part of a life that was totally and unconditionally devoted to physics and to the search for new insights.

*His friends and colleagues.*