Efim Fradkin 1924–1999

After 50 years of creative activity at the forefront of theoretical physics, Efim Fradkin died in Moscow on 25 May. His research extended from pioneering the functional method in quantum field theory and discovering, simultaneously with Schwinger, its Euclidean formulation, to basic work in string theory.

He was born in a Jewish neighbourhood near Minsk. At 16 he the university there for a year. The famous mathematician I M Gel’fand, who occasionally lectured there, recognized Fradkin’s outstanding abilities and, to support him, gave him 100 roubles. However, the war intervened and Fradkin’s family were killed. He joined the army and was wounded in the Battle of Stalingrad.

Fradkin appeared in Moscow in 1948 and was adopted by I Tamm and V L Ginzburg at the Theoretical Department of the Lebedev Physics Institute, which became his home for the remaining 50 years of his scientific life.

In the theatre of operations known as theoretical physics, Efim’s attacks have been launched along the whole front,” wrote Bryce DeWitt in Fradkin’s festschrift. Fradkin pioneered conformal field theory and contributed to the theory of turbulent mixing. He developed the Batalin–Fradkin–Vilkovisky method for quantizing general constrained systems, found new ways to solve spin lattice models, tackled the problem of grand unification via exceptional groups and studied transfer processes in plasma.

Fradkin introduced the method of Green’s functions in relativistic statistics and discovered, alongside Landau and Pomeranchuk, the zero-charge behaviour of QED (better known in the West as the Landau pole). He discovered open algebras and invented the first example of gauge supergravity. His relativistic eikonal approximation and the Efimov–Fradkin non-perturbative calculus gave birth to whole new trends of research.

Fradkin was awarded the Stalin state prize in 1953, the I E Tamm prize in 1980 and the Dirac medal in 1989 and was the first recipient of the Sakharov medal in 1996. He was a foreign member of Accademia Pontaniana in Naples and a full member of the Academy of Sciences of Russia. He was a member of CERN’s Theory Division, as guest professor of the director-general, in 1996/7.

Fradkin acted as a magnet for young theorists. When his coffin was exposed at the Lebedev Institute, two generations of disciples kept guard. For them – and for the whole community of theoretical physics– his passing was a tremendous loss.