# Irish physicist who had a theorem named after him

Sat, Nov 25, 2000

A physicist of international repute, Prof Lochlainn O'Raifeartaigh died on November 18th aged 67. . He was one of the world leaders in the theory of elementary particles. Like the institution he served, he was far better known outside Ireland than within. From 1960 to his death, he was a professor at the School of Theoretical Physics in the Dublin Institute for Advanced Studies. He was born in Dublin on March 11th, 1933, to Tarlach and Neans O'Raifeartaigh. His father was an Irish scholar and civil servant who as secretary of the Department of Education and later as first chairman of the Higher Education Authority was instrumental in the development of university education in Ireland.

In 1958, Lochlainn O'Raifeartaigh married Treasa Donnelly, a Celtic studies graduate of Queen's University, Belfast. They had met in the Donegal Gaeltacht and shared a life-long interest in the Irish language and culture.

Lochlainn O'Raifeartaigh was educated at St Joseph's CBS Marino, Castleknock College and University College Dublin, graduating with first-class honours in mathematical physics. As a student, he had attended lectures by the Nobel Laureate Erwin Schrodinger, the first director of the School of Theoretical Physics. When Schrodinger returned to Vienna in 1956 Lochlainn O'Raifeartaigh worked with John L. Synge on the Theory of Relativity.

He entered DIAS in 1956 and a year later was awarded a studentship by DIAS to study under Walter Heitler, one of the pioneers of Quantum Field Theory, at the University of Zurich where he was awarded his doctorate in 1960. He returned to DIAS in 1961 as assistant professor and was elected to membership of the Royal Irish Academy at the age of 29. Later he was elected to membership of the Academia Europaea.

Lochlainn O'Raifeartaigh specialised in the application of group theory to physics. His research on the symmetries of physical theories attracted much attention - particularly in the US. He spent the winter of 19631964 at the Madras Institute for Mathematical Sciences and in the autumn of 1964 went on extended leave from DIAS to Syracuse University in New York State.

While at Syracuse he made an important discovery, known now as the O'Raifeartaigh Theorem. In it he showed the impossibility of combining relativistic symmetry with other symmetries in a non-trivial way. Its announcement made him famous overnight. It also brought to an abrupt end the research programmes of many of his colleagues. Although his future career in the US was now assured, he chose instead to return to DIAS in 1968 as a senior professor, after spending one year at the Institute for Advanced Study at Princeton.

He attracted a succession of post-doctoral students from around the world, many of whom now occupy chairs of theoretical physics in their own countries. His style epitomised the principle on which the school, De Valera's creation, was founded. In introducing the Act establishing DIAS to the Dail, Eireann, De Valera expressed the belief that the founding of the School of Theoretical Physics would enable Ireland to achieve a reputation in theoretical physics comparable to that which it had in the time of William Rowan Hamilton.

As new concepts arose in theoretical particle physics, Lochlainn O'Raifeartaigh made a significant contribution to each. In the early 1970s super-symmetric theories arose, bypassing the difficulties described by the O'Raifeartaigh Theorem. A major advance was an idea of his which became known as the O'Raifeartaigh mechanism for the spontaneous breaking of super-symmetry. The content of his 1975 paper is to be found in almost every text book on super-symmetry.

In the early 1980s he made a fundamental contribution to the theory of monopoles in gauge theories. His work on gauge theories was consolidated in his book Group Structure of Gauge Theories (Cambridge University Press, 1991). Recently he had been applying the expertise gained from his work on two-dimensional conformal field theories to String Theories.

In recent years he received much international recognition, including the von Humbolt Research Award in 1998 and the Wigner Medal in August 2000, the latter for his "pioneering contributions to particle physics". However, he will be remembered by his colleagues as much for his humility, patience, kindness and humour as for his academic excellence.

Lochlainn O'Raifeartaigh's interests were not confined to physics. He was fluent in Irish, French and German. He was an enthusiastic theatre-goer and keen hillwalker. He put his interest in international politics to good use in the cause of nuclear disarmament; along with the Nobel Laureate Ernest Walton, he helped Michael Fry found the Irish Pugwash group, bringing together physicists and experts on international affairs. His book, The Dawning of Gauge Theory (Princeton University Press, 1997), showed him to be an accomplished historian of physics.

Lochlainn O'Raifeartaigh is survived by his wife Treasa, his sons, Conor, Finbar and Cormac, and his daughters Una and Aoife.

Prof Lochlainn O'Raifeartaigh: born 1933; died, November 2000