

Obituary



Louis de Broglie

1892–1987

Louis de Broglie died on 19 March 1987, aged 94. His passing should incite us to reflect upon what he has contributed to all physicists in the course of his long career, which was in many respects quite exceptional.

As the offspring of an illustrious family, which has given France marshals and ministers ever since the 17th century, young Louis received an education that was anything but conventional. First he obtained a degree in history, then, at the age of 19, he was attracted by physics, under the influence of his brother Maurice, who had himself won fame for his experiments with X-rays. When World War I broke out, he was assigned to a military wireless telegraphy laboratory, where he came into contact with good physicists.

At the end of the war, Louis de Broglie, then 28 years old, went into research. His social position raised him above any material concern, and he was relatively detached from the all-too classical physics of the Universities. Major problems fascinated his imaginative and original mind: the duality between the light wave and the photon; analogies between the analytical mechanics of point and wave propagation. After three years' solitary thinking, he wrote in 1923

those few pages in the *Comptes Rendus* in which he brought up the idea of a precise correlation between the movement of a particle and the propagation of a wave through Planck's constant. Shortly after, he was to give 'the first plausible explanation of the rules of stability of Bohr's orbits'.

Very soon, de Broglie's seminal idea bore fruit. Schrödinger, with his famous equation, gave physicists the tool that enabled them to solve more and more problems. On the other hand, de Broglie's waves were made manifest through the diffraction of electrons. But those experiments had begun independently of de Broglie's work. It is to be noted that in France Maurice de Broglie's laboratory was the one best equipped to achieve electron diffraction; but Louis de Broglie did not ask the group that was expert at beam diffraction to carry out an experiment.

Wave mechanics triumphed. The glory of the Nobel prize came to Louis de Broglie in 1929. He remained, however, dissatisfied, worried by doubts concerning the use that was being made of his idea. He was fond of saying: 'The source almost always disapproves of the river's course'.

Louis de Broglie did not agree with the purely probabilistic interpretation of the School of Copenhagen; he believed in the possibility of a theory that would reconcile the notion of a localized particle

moving along a trajectory with that of a wave guiding its movement. But several years of effort did not succeed in producing perfectly coherent results.

When appointed Professor of Theoretical Physics at the University of Paris, Louis de Broglie 'resigned' himself to teaching quantum mechanics. He remained convinced, however, that its formalism, remarkably useful though it proved to be, did not reach to the bottom of things, and that its basic postulates were by no means definitive.

About 1952, after a long interruption, Louis de Broglie took up his initial ideas and attempted to develop them with the help of a small group of collaborators. But, once again, the desired goal could not be attained.

In 1976, in a letter to Mr G. Lochak, Louis de Broglie wrote: 'When I come to die, I shall receive

various kinds of homage for a few days, and then be spoken of no more'. Not so. His name shall not be erased from the memories of men; firstly, because of the stroke of genius by which, single handed, he changed our vision of the atom world, thus making possible the development of new techniques that are in use today; but also because of the problem he raised and was unable to solve. That should serve us as a reminder not to let ourselves grow too complacent over the magnificent constructs of our logic and our mathematics: beyond them lies a *terra incognita* whence new worlds may yet emerge.

ANDRÉ GUINIER
Université Paris-Sud
91405 Orsay CEDEX
France