

## Duncan Haldane, Nobel laureate in Physics in 2016, was a visitor at IPhT



David Thouless, Duncan Haldane and Michael Kosterlitz have been awarded the Nobel Prize in Physics 2016 for their works on topological effects in condensed matter physics.

Duncan Haldane was distinguished for his famous *topological action* accounting for the radically different behavior of half-integer and integer spin chains, and for the introduction of a precursor model of topological insulators. He is an extraordinarily creative physicist, who could have been awarded the Nobel Prize for many other achievements. He introduced the concept of a *Luttinger liquid*, which has become one of the basic tools in condensed matter physics, as well as of several key contributions to the Quantum Hall Effect. Together with Edward Rezayi he performed the first numerical simulations of quantum Hall wave-functions, which turned out to be an extremely powerful way to understand this effect. Recently, he has developed a geometrical description of the fractional Quantum Hall Effect. Duncan is also one of the most colorful personalities among condensed matter theorists. He sometimes exhausts his listener, who often does not fully understand, but is always left with the conviction that a grain of truth has just been revealed to him.

Duncan Haldane is well-known in France. He spent four years at the Institute Laue-Langevin in Grenoble, from 1977 to 1981. During a visit to the IPhT in the early 1990s, he exposed some remarkable degeneracies of the spin chain which bears his name. This was the starting point of a collaboration with Denis Bernard, Michel Gaudin and Vincent Pasquier. They highlighted the *Yangian* symmetry of this spin chain and solved a spin version of the Calogero-Sutherland model. From a different perspective, Duncan Haldane and Vincent Pasquier proposed an explanation of the Fermi liquid observed in the Quantum Hall Effect at half filling, based on the idea that quasi-particles are dipoles.