

The 2014 Fritz London Memorial Prize Winners

Michel Devoret, (Yale University, USA)
<http://appliedphysics.yale.edu/michel-devoret>



Citation:

"The Fritz London Memorial Prize is awarded to Prof. Michel H. Devoret in recognition of fundamental and pioneering experimental advances in quantum control, quantum information processing and quantum optics with superconducting qubits and microwave photons."

Michel Devoret is the F. W. Beinecke Professor of Applied Physics and Physics at Yale University. While completing his electrical engineering studies for the MS degree at *Ecole Nationale Supérieure des Telecommunications* in Paris in 1975, he started graduate work in molecular quantum physics at the University of Orsay. He then joined Professor Anatole Abragam's laboratory in CEA-Saclay for his thesis work on NMR in

solid hydrogen, and received his PhD from Paris University in 1982. His two post-doctoral years in Professor John Clarke's laboratory at the University of California, Berkeley, were pivotal in his research orientation: working together with then graduate student John Martinis, he discovered the macroscopic level quantization of a Josephson junction, now the basis for superconducting quantum bits. Upon his return at Saclay, he pursued this research on quantum mechanical electronics, starting his own research group with Daniel Esteve and Cristian Urbina. In this new type of electronics, electrical collective degrees of freedom like currents and voltages behave quantum mechanically. Such mesoscopic phenomena underlie the realization of quantum information processing superconducting devices. The main achievements of the "quantronics group" under Michel Devoret's direction are the measurement of the traversal time of tunneling, the invention of the single electron pump, the first observation of the charge of Cooper pairs and the first measurement of the effect of atomic valence on the conductance of a single atom. The group's Cooper pair box device led to the first observation of Ramsey interference in a superconducting artificial atom. Michel Devoret has received the Ampere Prize of the French Academy of Science (together with Daniel Esteve, 1991), the Descartes-Huygens Prize of the Royal Academy of Science of the Netherlands (1996), the Europhysics-Agilent Prize of the European Physical Society (together with Daniel Esteve, Hans Mooij and Yasunobu Nakamura, 2004) and the Bell Prize (together with Robert Schoelkopf, 2013).

Michel Devoret taught from 2007 to 2012 at *College de France*. He is a member of the American Academy of Arts and Sciences (2003) and a member of the French Academy of Sciences (2007). His present research at Yale, in collaboration with Professors Robert Schoelkopf, Steven Girvin, and Dr Mazyar Mirrahimi (Inria), focuses on quantum measurements and quantum error correction with Josephson junction circuits. Together with Professor Leonid Glazman, Michel Devoret also investigates at Yale the properties of a new superconducting artificial atom, the fluxonium.