

## L a u d a t i o

For his many original and outstanding contributions to the field  
of electronic systems with disorder and interactions

### **Prof. Dr. Boris Altshuler**

has been awarded the  
Martin-Gutzwiller-Fellowship 2011/2012  
of the Max Planck Institute for the Physics of Complex Systems.

Boris Altshuler is an eminent international authority in theoretical condensed matter physics. He has made important contributions covering the interplay of interactions and disorder in metals, the properties of electrons confined on mesoscopic lengthscales, as well as the physics of graphene, with his interests more recently even extending to quantum optimisation algorithms.

The career of Boris Altshuler itself reflects the great geopolitical upheaval of the last decades. Born in Leningrad, he spent his scientifically formative years there, before moving to the United States of America in 1989, which welcomed him with an appointment as Professor at the Massachusetts Institute of Technology. In the mid-1990s, he made a transition to New Jersey, where he held posts at Princeton University alongside the NEC Research Laboratories, at the time one of several major technology companies generously supporting fundamental physics research, before moving on to his current position at Columbia University.

His work on the combined effect of disorder and interactions in metals, including the effects of externally applied magnetic fields, rank among the highlights of many-body physics of the last half century.

In addition to this, Boris Altshuler has made foundational contributions to the study of electrons in confined geometries, a field which today goes under the heading of mesoscopic physics. Particularly worthy of mention is his groundbreaking work on fluctuations in the extrinsic conductivity of disordered conductors, more popularly known as universal conductance fluctuations.

Other contributions of his have ranged widely and are characterised by a high degree of originality. A case in point is his proposal for engineering electronic lenses in the framework of graphene-based electronics.

In more recent developments, Boris Altshuler has considered the phenomenon of many-body localisation, which occurs in the Fock space of the many-body wavefunction. He has also explored the role of localisation phenomena for placing limits on the performance of quantum optimisation algorithms proposed in the framework of adiabatic quantum computation and quantum annealing.

Boris Altshuler is an engaging, combative and well-travelled scientist, with a network of collaborators spanning the globe, to whom he is a constant source of scientific inspiration. He is never shy to enter newly developing fields, and we are confident that his ideas will continue to shape the evolution of our understanding of many-body physics.