

L a u d a t i o

In recognition of his varied contributions to our understanding of
the physics of gauge fields in condensed matter physics

Prof. Dr. Benoît Douçot

has been awarded the

Martin Gutzwiller Fellowship 2020/2021

of the Max Planck Institute for the Physics of Complex Systems.

Benoît Douçot has made many insightful contributions to the study of cooperative phenomena in the solid state and related fields. His work has spanned the range from microscopic modelling via effective descriptions, all the way to thinking about experimental implementations and device physics.

Central to his research has been the role of gauge fields in these settings. One specific focus of his work has been on the interplay between external and emergent gauge fields in collective behaviour of Skyrmions, the topologically charged spin textures arising near integer filling in quantum Hall physics. Here, originally motivated by multicomponent systems appearing in graphene in a magnetic field, he has uncovered a beautiful interleaving of mathematical structures and physical properties.

Another prominent interest of his is the study of non-Abelian gauge fields, motivated by their possible realisation in Josephson junction arrays in the context of topological quantum computing. In addition, particularly original was his proposal of Aharonov-Bohm cages, a localisation mechanism based on specific background gauge field configurations.

Finally, his early work on correlated electrons in the heady days following the discovery of the high-temperature superconductors deserves separate mention. This has become part of the canon of our understanding of – conventional and unconventional – magnetism.

Benoît Douçot is an engaging discussion partner, as well as a role model for approachability. He has a broad view of physics and mathematics, based on the combination of a first-rate education, unfailing curiosity and an exemplary open mind. We look forward to hearing about the problems he will choose to tackle next.