Max-Planck-Institut für
Struktur und Dynamik der Materie
Max Planck Institute for the Structure and Dynamics of Matter

IMPRS UFAST Call for PhD applications 2023/2024

AR2- Cavity quantum electron dynamical control of magnetic topological phases

Title of PhD Project	**Cavity quantum electrondynamical control of magnetic topological phases**
Type	Theoretical (Condensed Matter Physics)
Supervisor(s)	Prof. Angel Rubio Dr. Emil Viñas Boström
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	1
Abstract:	The purpose of this project is to develop schemes to control the magnetic state of correlated systems by tailoring their electrodynamic environment [1-3]. A particular focus will be on studying two-dimensional magnets with topological orders, and the interplay between light and matter excitations in such systems. To describe strongly coupled light-matter systems we will combine first principles simulations with effective low-energy models, which can be solved with numerically exact methods to properly account for the strong correlations and quantum fluctuations of the system [2,3]. To further increase the control over system, strong light-matter coupling may also be combined with finite temperatures and moiré twisting. [1] S. Latini, D. Shin, S. A. Sato, C. Schäfer, U. De Giovannini, H. Hübener and A. Rubio, PNAS 118 31 (2021). [2] E. Vinas Boström, A. Sriram, M. Claassen and A. Rubio, arXiv:2211.07247 [3] L. Weber, E. Vinas Boström, M. Claassen, A. Rubio and D. M. Kennes, arXiv:2302.08528
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