



Title of PhD Project	Endyonic Chemistry/Physics
Type	Theory
Supervisor(s)	Dr. Dominik Sidler and Dr. Michael Ruggenthaler, Prof. Angel Rubio
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	1
Abstract:	Seminal experimental results have demonstrated that molecules can be strongly coupled to the (quantized) photon field of optical cavities. This can induce dramatic chemical changes, which may eventually provide unprecedented control of chemical reactions. Inspired by the early experimental advancements, the field of polaritonic chemistry has emerged. However, novel theoretical and experimental results indicated that polaritons (excited hybrid light-matter states) are insufficient to explain many experiments. Instead, we have strong evidence that endyons are responsible. Endyons are a conceptually novel light-matter state, which modifies groundstate properties and introduces novel phases of matter. The endyon shares properties with spin glasses and remains largely unexplored so far. Unravelling its mysteries is the ultimate goal of this project. This provides ideal ground to pursue cutting-edge interdisciplinary research. The PhD project can thus be tailored specifically to the background and interests of the applicant. It may involve fundamental theoretical questions, the development of novel algorithms and HPC code, as well as compelling applications.
Contact person for scientific questions about the project:	Dominik Sidler: dominik.sidler@mpsd.mpg.de Michael Ruggenthaler: michael.ruggenthaler@mpsd.mpg.de Angel Rubio: angel.rubio@mpsd.mpg.de
Research Group Website:	MPSD Theory Department Website