

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



AR8- Light-induced dynamical correlations

Title of PhD Project	Light-induced dynamical correlations
Type	Theory
Supervisor(s)	Prof. Angel Rubio Dr. Nicolas Tancogne-Dejean Dr. Michael Ruggenthaler
Affiliation(s):	Max Planck Institute for the Structure and Dynamics of Matter
Number of positions:	1
Abstract:	<p>Dynamical correlations are key to describe important phenomena in condensed matter like scattering or electron relaxation dynamics. However, they represent a challenge for most practical first principles quantum mechanical methods. The focus of this project is to develop a novel theoretical framework within time-dependent density/current density functional theory to go beyond the vastly employed adiabatic exchange-correlation functionals to include memory and nonlocal effects. Among the possible applications, particular interest will be given to the study of the relaxation dynamics of electrons in two-dimensional quantum materials (like transition metal dichalcogenides, TMDs) excited out of equilibrium by intense and ultrashort laser fields or the effect of photon fluctuations in light-matter strong-coupling situations.</p> <p>Reference: Tchenkoue, M. L. M., Penz, M., Theophilou, I., Ruggenthaler, M., & Rubio, A. (2019). Force balance approach for advanced approximations in density functional theories. <i>The Journal of Chemical Physics</i>, 151(15)</p>
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