

# 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 2021/2022



**Dynamical properties of solids**

**A. Rubio-1**

<b>Title of PhD Project</b>	<b>Dynamical properties of solids</b>
<b>Type</b>	Theoretical (Condensed Matter Physics)
<b>Supervisor(s)</b>	Prof. Angel Rubio Dr. Heiko Appel
<b>Affiliation(s):</b>	Max Planck Institute for the Structure and Dynamics of Matter
<b>Number of positions:</b>	1
<b>Abstract:</b>	<p>The main focus of this project is to address the electronic and structural dynamics of extended systems (solids, 2D and topological materials) driven (and controlled) by laser pulses. The project amounts to develop a new theoretical framework within these dependent density/current functional methods to treat quantum mechanically strong light-matter interaction processes. Different degrees of approximations will be required to be able to described realistic systems. Among one of the envision applications would be the description of strong-non linear phenomena in solids: photo-induced currents, electron emission and light-induced topological states.</p> <p>Reference:</p> <p>(1) From a quantum-electrodynamical light–matter description to novel spectroscopies (2018) M. Ruggenthaler, N. Tancogne-Dejean, J. Flick, H. Appel &amp; A. Rubio <i>Nature Reviews Chemistry</i> volume2, Article number: 0118</p>
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