

Joint Quantum Sciences Seminar

Wednesday, October 30, 4:00 pm
Jefferson 250

Prof. Angel Rubio

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Center For Computational Quantum Physics (CCQ)

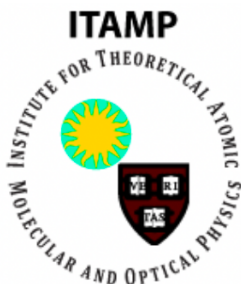
“Quantum Cavities and Floquet Materials Engineering from First Principles QEDFT”

An appealing and challenging route towards engineering materials with specific properties is to find ways of designing or selectively manipulate materials, especially at the quantum level. We will provide an overview of how well-established concepts in the fields of quantum chemistry and materials have to be adapted when the quantum nature of light becomes important. We will pursue the question whether it is possible to create these new states of materials as groundstates of the system. To this end we will show how the emerging (vacuum) dressed states resembles Floquet states in driven systems. A particular appeal of light dressing is the possibility to engineer symmetry breaking which can lead to novel properties of materials, e.g. coupling to circularly polarized photons leads to local breaking of time-reversal symmetry enabling the control over a large variety of materials properties (e.g. topology). We show that the new quantum electrodynamics density-functional formalism (QEDFT) can account for those effects. We illustrate the realization of those ideas in molecular complexes and 2D materials.

Student Presentation by Pavel Dolgirev will begin at 4:00 PM

Guest Presentation will begin at 4:30 PM

Refreshments will be provided



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