



Thursday, July 21, 2022, 16:15, Hybrid Colloquium: EW 202 & [Zoom](#)

Prof. Ignacio Franco

[Franco Group at the Departments of Physics and Chemistry](#)
[University of Rochester](#), USA



Quantum Frontiers in Molecular and Material Science

In this talk, I will summarize recent efforts by my group exploring quantum frontiers in molecular and materials science. Specifically, I will discuss the state of the art in the ultrafast quantum control of matter at the level of electrons and, in particular, how in the context of nanojunctions it is possible to disentangle ultrafast laser-induced currents into contributions by real and virtual carriers and use that to design petahertz electronic logical circuits elements that operate 10^6 times faster than present-day capabilities. Then, I will introduce our theoretical proposal for an analog quantum simulator of the excited state dynamics of molecules in condensed phase environments that is based on integrating semiconductor quantum dots with quantum electronic circuits, and discuss why analog quantum simulation can have an advantage over conventional simulation. If there is time, I will summarize efforts by my group to understand quantum decoherence in molecules and, in particular, I will introduce a novel theoretical scheme to quantify dissipation pathways of molecules in condensed phase environments.

Room EW 202 and Zoom Room:

<https://tu-berlin.zoom.us/j/61801327201?pwd=bno1UytVNGZ4TldNejFtQVZyVGFjZz09>

Meeting ID: 618 0132 7201, Passcode: 927532