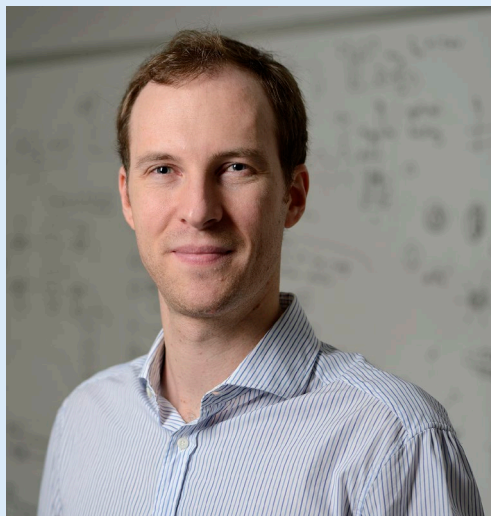


INORGANIC CHEMISTRY SEMINAR



Prof. Thomas J. Kempa

Department of Chemistry and Materials Science, Johns Hopkins University

“Precision Synthesis of Quantum Material Building Blocks”

Abstract: Quantum materials are poised to transform the development of next-generation sensors, analytical instruments, information processing systems, and energy conversion platforms. Realizing these lofty goals will require low-dimensional crystals whose size, shape, structure, and composition can be tailored to atomic levels of precision. Chemistry will play a vital role in creating these crystalline building blocks of quantum matter. In this vein, the Kempa group has focused on the precision synthesis of 2-dimensional (2D) materials to harness quantum phenomena. Our work with 2D atomic lattices and 2D molecular frameworks has revealed that even subtle manipulations of the dimensionality and morphology of these materials yield substantial property changes. Notably, we can dramatically manipulate the structure of 2D transition-metal dichalcogenides by growing them on chemically tailored surfaces. The resulting nanoribbons emit light whose energy and profile show an unusual progression with crystal size. Seeking to expand the 2D materials landscape, we have also prepared and examined new 2D molecular frameworks. Reversible phase switching can be induced in these frameworks with concomitant modulation of electronic transport. Our efforts underscore the importance of rational synthesis in building low-dimensional materials that enable new discoveries and advance the fields of optics, electronics, energy conversion, and quantum sensing.

Wednesday, February 16th 2022

UCLA College | Physical Sciences
Chemistry & Biochemistry

4:00 p.m. | Mol Sci 3440 & Via Zoom

More information: jzabala@chem.ucla.edu