

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Single-pulse manipulation of charge density waves in 1T-TaS₂"

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Abstract: The study of charge density waves (CDW) in 1T-TaS₂ dates back half a century. This layered compound undergoes several distinct CDW transitions as it cools, entering a Mott-insulating CDW state below ~ 180 K. In the past four years, the subject has attracted considerable attention since a hidden metallic state was found at cryogenic temperature after an electrical or optical pulse was applied to the insulating phase. Recently, we discovered a new way to manipulate the CDW via a light pulse, this time at room temperature. A femtosecond laser pulse is able to create mirror domain walls in the CDW. The process is entirely reversible, with another pulse erasing the walls. In this talk, I will discuss both the low-temperature experiments on the hidden state as well as the present observation at room temperature. If time permits, I will also comment on the possible mechanism behind these pulse-induced metastable states.

12:00pm noon
Tuesday, September 18, 2018
Duboc Room (4-331)

Host: Debanjan Chowdhury