



Seminar/Talk

Quantum couplings at nanoscale solid-liquid interfaces

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Host: Baptiste Coquinot (Lemeshko Group)

Liquids are traditionally described within classical physics, whereas solids require the tools of quantum mechanics. I will discuss how in nanoscale systems, this distinction no longer holds. The dynamics of liquids confined to nanometer-scale channels can couple to the internal degrees of freedom of the channel walls – in particular, electrons and phonons. This gives rise to a liquid-solid Coulomb drag effect, which holds promise for hydroelectric energy conversion at small scales. Conversely, electronic properties of 2D materials can be affected in non-trivial ways by the presence of liquids such as water. Using quantum embedding calculations, we have demonstrated that liquid charge fluctuations can induce retarded pairing of electrons, which then form an unusual bipolaronic metal phase.

Tuesday, November 18, 2025 11:00am - 12:00pm

Office Bldg West / Ground floor / Heinzl Seminar Room



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