## Seminar/Talk

# From Electro-Fluidic Coupling to Friction Engineering: electric current generation and flow tunnelling

**Baptiste Coquinot**
ENS Paris

Host: Mikhail Lemeshko

An electronic current driven through a conductor can induce a current in another conductor through the famous Coulomb drag effect. Similar phenomena have been reported at the interface between a moving fluid and a conductor, but their interpretation has remained elusive. I will present our recent theoretical work, which predicts that a globally neutral liquid can generate an electronic current in the solid wall along which it flows [1], building on the idea of solid-liquid quantum friction [2]. This hydrodynamic Coulomb drag originates from both the Coulomb interactions between the liquids charge fluctuations and the solids charge carriers, and the liquid-electron interaction mediated by the solids phonons, consistently with experimental observations [3]. Our results provide a roadmap for controlling nanoscale liquid flows at the quantum level. In particular, we predict a fluidic equivalent of electron tunnelling, termed flow tunnelling: a flowing liquid may transfer momentum to another liquid through a solid wall. We directly observe this phenomenon in semi-classical molecular dynamics simulations, paving the way to a wealth of nanofluidic applications inspired by condensed matter physics.

**Friday, February 2, 2024 01:00pm - 02:15pm**
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)

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