



# Department of Physics Colloquium

November 28, 2022



3:00 PM

## Luttinger Liquids in a Two-Dimensional Moiré Lattice

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Interacting electrons in metals are typically described by the established Fermi liquid theory, which is qualitatively similar to the theory of a non-interacting Fermi gas. One known exception is the interacting one-dimensional (1D) conductors, in which electrons only move along one spatial direction and are generally described by the Luttinger liquid model at low temperatures. The 1D Luttinger liquids host interesting phenomena due to strong correlations, including the power law suppression of the density of states at Fermi energy and the spin-charge separation. Can the novel Luttinger liquid phenomena, expected in a 1D system, emerge in a two-dimensional (2D) system at low temperatures? In this talk, I aim to address this long-standing question based on our recent experiments on twisted bilayer  $\text{WTe}_2$  ( $\text{tWTe}_2$ ). I will argue that this new moiré material provides an excellent platform for studying emergent Luttinger liquids in an anisotropic 2D system and may be related to various coupled-wire models for investigating strongly correlated physics.

**This colloquium will be held in-person, at SERC 116  
unless announced otherwise.**