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Coulomb drag in coupled electronic systems of different dimensionalities BEN YU-KUANG HU, The University of Akron — Coulomb drag occurs when two electrically independent electronic systems are situated in close enough proximity to each other that the Coulomb coupling between the two systems causes an electric current in one system to drag along a carriers in the other system. The magnitude of this effect is quantified by the drag rate. We derive the formalism to determine the drag rate in systems of different dimensionalities (for example, one-dimensional quantum wires coupled to two-dimensional quantum wells), based on coupled transport equations. We discuss how the hybrid coupled plasmons of the systems of different dimensionalities can affect the drag, and we investigate the effect that plasmons in the higher-dimensional system can have on the drag rate of the carriers in the lower-dimensional system.

Ben Yu-Kuang Hu
The University of Akron

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