

Abstract Submitted  
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**Nonlocal formulation of spin Coulomb drag in nanostructures:  
implications for time-dependent current-density-functional theory<sup>1</sup>**

CARSTEN A. ULLRICH, University of Missouri-Columbia, IRENE D'AMICO, University of York — The spin Coulomb drag (SCD) effect occurs in materials and devices where charged carriers with different spins exchange momentum via Coulomb scattering. This causes frictional forces between spin-dependent currents that lead to dissipation and limit spin mobilities. We consider the role of the SCD in the damping of intersubband spin plasmons in semiconductor quantum wells, and show that a local density approximation leads to overdamping. A nonlocal formulation of the SCD is developed which agrees with experimental observations of spin plasmon linewidths. General consequences for using density-functional approaches to describe electronic many-body effects in nanostructures are discussed.

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