

Abstract Submitted
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Spin excitations in semiconductor nanostructures with spin-orbit coupling¹ SHAHRZAD KARIMI, CARSTEN ULLRICH, University of Missouri - columbia — Spin-orbit coupling is a relativistic effect, where electrons in motion experience electric fields as magnetic fields in their rest frame, which then interact with their spin. The spin-orbit interaction opens up new possibilities to manipulate the charge and spin dynamics in materials and devices; in particular, tuning the spin-orbit strength via external gating is the key to novel devices such as the spin field-effect transistor. Motivated by this, we will carry out systematic studies to explore the impact of spin-orbit interactions on collective spin-density and spin-flip excitation in semiconductor quantum wells. We will describe electronic many-body effects using time-dependent density-functional theory (TDDFT) in the linear-response regime. The effect of impurity scattering will be studied with a generalized relaxation-time approach.

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