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Spin-dependent tunneling conductance between a 2D quantum well and a 1D quantum wire YUN-PIL SHIM, University of Texas at Austin, S. K. LYO*, Sandia National Laboratories — We study spin-dependent tunneling current between a quantum well (QW) and a quantum wire with in-plane magnetic field and Rashba spin-orbit interaction in the 2D quantum well. We show that the tunneling current can be spin-polarized in the presence of both an in-plane magnetic field and spin-orbit interaction. However, in the absence of the magnetic field, the isotropy of the energy spectrum makes the total tunneling current spin independent. The in-plane magnetic field changes the relative band minimum positions of the 2D QW and the wire in k-space and gives rise to a spin- polarized tunneling current. We calculate the tunneling conductance for each spin component and show that the current as spin-polarization which depends on the in-plane magnetic field. * Supported by the U.S. DOE under contract DE-AC04-94AL8500.

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