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Interface effects and electronic transport in superconducting heterostructures with spin-orbit coupling[1] NAYANA SHAH, University of Cincinnati, KUEI SUN, The University of Texas at Dallas — Study on electronic transport in superconducting heterostructures with spin-orbit coupling (SOC) has become an active field for exploring spintronic properties or topological states of matter. For example, recently observed zero-bias conductance peaks in one-dimensional superconductor-semiconductor heterostructures in the presence of SOC and magnetic field are of interest for realizing Majorana fermions. However, most study considers SOC only in bulk materials, while the interface effects, which can significantly alter the physics in spin-active systems, have not been fully analyzed for systems with SOC. Here we construct a general model to describe interfaces in a superconductor-normal metal junction with bulk SOC. We also systematically investigate the trend of conductance as the system parameters vary. Our results are of interest for understanding a variety of transport behaviors in the presence of SOC and are of relevance also for characterizing interfaces in experimental systems.

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