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Quantum conduction through two narrow half-metallic leads with opposite spin coupled to a superconductor QIAN WANG, Texas Center for Superconductivity, CHIA-REN HU, Department of Physics, Texas A&M University, CHIN-SEN TING, Texas Center for superconductivity — We study quantum conduction through a two-dimensional junction consisting of two narrow half-metallic leads with opposite spin coupled to a wide superconductor at zero temperature. When a half-metallic lead is coupled to a superconductor, conductance vanishes at zero bias. Adding another half-metallic lead with opposite spin, conductance becomes non-zero due to Andreev reflection at the interface when the distance between the centers of the two leads is smaller than the coherence length of the superconductor. With the use of the Bogoliubov equations, we compute the conductance as a function of the distance between the centers of the two half-metallic leads.

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