

Abstract Submitted  
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**Edge channel transport in a HgTe waveguide modulated by two magnetic barriers**<sup>1</sup> FENG ZHAI, University of Puerto Rico at Mayaguez, XUANPING JIN, Zhejiang Normal University, JUNQIANG LU, University of Puerto Rico at Mayaguez — we investigate the effects of a magnetic double barrier on the ballistic transport properties of edge-states in a HgTe waveguide with inverted band structures. When its energy is in the bulk gap and close to the bulk conduction band of leads, the electron incident from a quantum spin Hall (QSH) state can be almost totally reflected as the two magnetic barriers are in the antiparallel configuration. For the magnetic double barrier in the parallel configuration, the same electron can transmit nearly perfectly for a proper spin orientation. In the antiparallel configuration, the spin polarization of the output current vanishes. This distinction in the transmission indicates that the proposed edge-state device has two functions: magnetic switching and spin filtering. Our calculations also indicate that nonuniform magnetic fields can break the QSH states more effectively than uniform ones.

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JUNQIANG LU  
University of Puerto Rico at Mayaguez

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