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**Spin Transport and Giant Electroresistance in Ferromagnetic Graphene Vertical Heterostructures**<sup>1</sup> HEE CHUL PARK, Center for Theoretical Physics of Complex Systems, IBS, NOJOON MYUNG, Department of Material Science and Engineering, University of Ioannina, SEUNG JOO LEE, Quantum-functional Semiconductor Research Center, Dongguk University — We investigate spin transport through ferromagnetic graphene vertical heterostructures where a sandwiched tunneling layer is either a normal or ferroelectric insulator. We show that the spin-polarization of the tunneling current is electrically controlled via gate voltages. We also demonstrate that the tunneling current of Dirac fermions can be prohibited when the spin configuration of ferromagnetic graphene sheets is opposite. Giant electroresistance can thus be developed by using the proposed heterostructure in this study. The effects of temperature on spin transport and the giant electroresistance ratio are also investigated. Our findings discover the prospect of manipulating the spin transport properties in vertical heterostructures through electric fields via gate and bias electrodes.

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Hee Chul Park  
Center for Theoretical Physics of Complex Systems, IBS

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