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Transport Studies of Exchange Interaction at Magnetic-Insulator/Graphene and Magnetic-Insulator/Topological-Insulator Interfaces CHING-TZU CHEN, IBM TJ Watson Research Center, SUNWOO LEE, Department of Electrical Engineering, Columbia University, DAVIDE CUTAIA, IBM TJ Watson Research Center, PENG WEI, JAGADEESH MOODERA, MIT Francis Bitter Magnet Laboratory, JOEL CHUDOW, DANIEL WORLEDGE, IBM TJ Watson Research Center, ANTHONY RICHARDELLA, NITIN SAMARTH, Department of Physics, Penn State University — Spintronics, where carrier spin instead of charge serves as the state variable, is a promising candidate for post-CMOS low-voltage logic. An essential component of the spin-FET class of spintronic devices is the electrical modulation of spin. To realize this functionality, we explore the interfacial exchange interaction of quasi-2D systems in proximity to a magnetic insulator (MI). We study the magneto-transport of graphene/MI heterostructures as the model system. In this talk, we will discuss several schemes for probing the interfacial exchange. We demonstrate that the H-bar configuration exhibits strong enhancement in non-local resistance as a result of the exchange interaction. We will also present the magneto-transport results of MI multilayers on topological insulators as another platform for building low-voltage spintronic devices.

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