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Probing excitations in insulators by injecting spin currents SHUBHAYU CHATTERJEE, SUBIR SACHDEV, Harvard University — Observation of fractional excitations in insulating spin-systems has been a long-sought goal in physics. In spite of promising evidence for observation of spin liquids, the exact nature of possible ground states, and in particular, the presence of a spin-gap is still unclear. Most experiments till this point have focused on thermodynamic measurements. We suggest a transport measurement as an alternate window into the nature of excitations of insulating spin systems. We couple a metal with a non-equilibrium spin-accumulation to an equilibrium insulating spin-system [1], and develop a general formalism to compute the spin current. We use this to calculate the current into ordered antiferromagnets as well as spin liquids, and note salient features in the spin conductance. [1] Takei et. al. Phys. Rev. B 90, 094408 (2014)

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