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Theoretical study of quantum transport in two dimensional MoS2[1] INDRA YUDHISTIRA, HENNRIK SCHMIDT, LEIQIANG CHU, Department of Physics, National University of Singapore and Centre for Advanced 2D Materials and Graphene Research Centre, GOKI EDA, Department of Physics and Department of Chemistry, National University of Singapore and Centre for Advanced 2D Materials and Graphene Research Centre, SHAFFIQUE ADAM, Yale-NUS College, Singapore, Centre for Advanced 2D Materials and Graphene Research Centre, and Department of Physics, National University of Singapore — In this work, we calculate the quantum correction to the conductivity for disordered electrons in a two-dimensional transition metal dichalcogenide and show that it exhibits crossover from the symplectic to orthogonal universality classes. Due to the strong spin-orbit coupling, this system displays weak anti-localization behaviour in a strong magnetic field, while symmetry breaking introduces a crossover parameter, causing weak localization in a weak magnetic field. Temperature and carrier density dependence of coherence length and crossover parameter are discussed making comparisons with available experimental data.

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Indra Yudhistira
National University of Singapore

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