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Ferromagnetism in Single Crystal MoS_2[1] SIMA SAEIDI VARNOOSFADERANI, Department of Physics, University of Florida, SEFAATTIN TONGAY, Department of Material Science and Engineering, University of California, Berkeley, BILL APPLETON, Nanoscience Institute for Medical and Engineering, University of Florida, JUNQIAO WU, Department of Material Science and Engineering, University of California, Berkeley, ARTHUR HEBARD, Department of Physics, University of Florida — We report on the magnetic properties of MoS_2 flakes measured from room temperature down to 10 K and magnetic fields up to 5 Tesla. Molybdenum disulfide (MoS_2) is one of the most stable layered transition metal dichalcogenides, which has a finite band gap and is regarded as a complementary (quasi-) 2D material to graphene. We find that single crystals of MoS_2 display ferromagnetism superimposed onto a large temperature-dependent diamagnetism and observe that ferromagnetism persists from 10 K up to room temperature. We attribute the existence of ferromagnetism partly to the presence of zigzag edges in the magnetic ground state at the grain boundaries. Since the magnetic measurements are relatively insensitive to the interlayer coupling, these results are expected to be also valid in the single layer limit.

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Sima Saeidi Varnoosfaderani
Department of Physics, University of Florida

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