

Seminar announcement

Tuesday, June 4, 2024 1:30 pm WSI, Seminar room S 101 Exclusively in person

"Strain controlled magnetism in 2D semiconductor CrSBr"

Probing and controlling magnetic materials is a central thrust of condensed matter physics with implications for both fundamental science and new computing technologies. Recently, the layered antiferromagnetic semiconductor CrSBr has emerged as a highly tunable platform for investigating nanoscale magnetism. The coupling of electronic and spin structures enables the charge carriers and excitons in this material to serve as a sensor of both the static interlayer magnetic coupling and magnetic excitations, i.e., magnons. Using optical spectroscopy and electronic tunneling probes, we found that the magnetic order of CrSBr is extremely tunable by tensile strain. Notable findings include unique magnon excitations and a reversible antiferromagnetic (AFM) to ferromagnetic (FM) phase transition occurring at large but experimentally feasible strains. Distinct from the magnetic field-induced AFM to FM transitions studied in other 2D magnets, we observed many intermediate magnetic states consisting of both FM- and AFM-coupled layers which can switch stochastically when the strain is finely adjusted. These results establish CrSBr as an exciting platform for harnessing spin-charge-lattice coupling to the 2D limit.

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