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One Dimensional Magnetic Dichalcogenide Nanostructures TIMOTHY KIDD, AARON O'SHEA, PAUL SHAND, LAURA STRAUSS, University of Nortern Iowa — The transition metal dichalcogenides are a class of layered 2D materials with a rich variety of electron and, with doping, magnetic characteristics. They are structurally akin to graphite and, like their carbon based analogs, can be induced to form various low dimensional nanostructures. One dimensional forms are of particular interest, with the dichalcogenides forming nanometer scale tapes, rods, or hollow tubes. Given the novel properties of the bulk analogs of these materials, these 1D nanostructures could provide novel pathways for studying the effects of dimensional confinement. However, one aspect of the macroscopic systems that has not been repeated for the 1D nanostructures is the ability to dope the nanostructures with magnetic ions. By modifying the synthesis process, we have been able to overcome this obstacle to create highly 1D dichalcogenide structures with spin-glass like or ferromagnetic ground states. We hope to extend this technique to be able to create a variety of such nanostructures to explore how quantum size effects can alter the base magnetic properties of these materials.

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