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Exploration of the new class of layered III-VI Diluted Magnetic Semiconductors (DMS) THOMAS PEKAREK, Physics, Univ. of N. Florida, I. MIOTKOWSKI, A.K. RAMDAS, Physics, Purdue Univ. — We have explored a new class of quasi-two-dimensional III-VI Diluted Magnetic Semiconductors (DMS) exhibiting a wide range of magnetic behavior. Several are good candidates for potential device applications. In In1-xMnxSe, we found a remarkably large thermal hysteresis (Delta T is approximately 200 K) extending up to room temperature. This is an important material because a typical thermal hysteresis in most materials has a Delta T approximately 20 K occurring well below room temperature. The thermal hysteresis is also seen in transport measurements for In1-xMnxSe. To date, we have found good agreement between experiment and theory for the 1st three III-VI DMS systems (In1-xMnxSe, In1-xMnxS, and Ga1-xMnxS). Ga1-xFexSe is unique amount the III-VI DMS exhibiting substantial magnetic anisotropy. In Ga1-xMnxS, we have found a spin glass transition and critical exponents ($\gamma = 4.0$, $\beta = 0.8$, and $\delta = 5.5$) that are in agreement with the theory. We surprisingly found that the spin glass transition in the 2-D IIIVI DMS similar to spin glass in 3-D II-VI DMS. [This research was supported by the UNF Terry Presidential Professorship, a Purdue University Academic Reinvestment Program and by the National Science Foundation (NSF) Grant Nos. DMR-07-06593 and DMR-04-05082.]

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