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Temperature and Magnetic Field Effects on the Raman Spectra of $TaSe_2$[1] J. HARDING[2], Graduate Student, A. R. HIGHT WALKER[3], J. R. SIMPSON[4], Contributors, TOWSON UNIVERSITY COLLABORATION, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) COLLABORATION — In bulk form, $TaSe_2$ exhibits transitions between commensurate and incommensurate charge-density wave (CDW) phases, and is attracting interest for advance device applications. In order to explore the evolution of the groundstate CDW phase, mechanical exfoliation of bulk crystals provides freshly cleaved surfaces and may be used to prepare few- to single-layer flakes. In the present work, we extended our opto-thermal Raman measurements [1] on MoS_2 to include other TMDs, specifically $TaSe_2$, in both *1T* and *2H* crystallographic phases. A novel, magneto-Raman microscope system affords measurement of low-frequency (down to $10cm^{-1}$) vibrational modes as a function of both temperature (˜10K to 300K) and magnetic field (0T to 9T). The dependence of the observed Raman-active phonons on temperature and magnetic field will be discussed and compared with earlier results on MoS_2. Specifically, we observe the appearance of low-frequency, zone-folded modes in the CDW state, which soften with temperature similar to the higher frequency, in-plane E_{2g} mode. Additionally, magnetic-field dependence, including Faraday rotation in the micro-crystal insert will be discussed.

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