Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Dynamics of valley polarized excitations in monolayer MoSe2 using transient spin-grating spectroscopy FAHAD MAHMOOD, EDBERT SIE, YI-HSIEN LEE, JING KONG, NUH GEDIK, Massachusetts Inst of Tech-MIT
— We report on a transient spin-grating measurement on CVD-grown monolayer MoSe2. Two cross-polarized 1.5 eV short laser pulses interfere on the sample to generate a polarization grating. This selectively induces K and K' valley excitations, the populations of which vary sinusoidally across the surface. The decay of this valley polarization grating is studied through a diffracted probe beam. We find that the decay strongly depends on the initial population and exhibits a characteristic temperature dependence. These results provide important insights into the lifetime and mechanisms for inter-valley scattering as well as possible scattering to dark exciton states in monolayer transition metal dichalcogenides.

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Date submitted: 14 Nov 2013 Electronic form version 1.4