

Abstract Submitted
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Dependence of Effective Mass on Spin and Valley Degrees of Freedom MANSOUR SHAYEGAN, TAYFUN GOKMEN, MEDINI PADMANABHAN, Dept. of Electrical Engineering, Princeton University, Princeton, NJ 08544 — We measure the effective mass (m^*) of interacting two-dimensional electrons confined to an AlAs quantum well at a fixed density while we change the conduction-band valley occupation and the spin polarization via the application of strain and magnetic field, respectively [1]. Compared to its band value, m^* is enhanced when the electrons are valley or spin unpolarized, and the largest enhancement is observed for the case where both spin and valley are unpolarized. Consistent with the study of M. Padmanabhan et al., in the fully spin- and valley-polarized regime, the measured m^* is suppressed compared to the band value. Incidentally, in the fully spin- and valley-polarized regime, the electron system exhibits an insulating behavior. [1] T. Gokmen *et al.*, Phys. Rev. Lett. **101**, 146405 (2008). [2] M. Padmanabhan, *et al.*, Phys. Rev. Lett. **101**, 026402 (2008).

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