

Abstract Submitted
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Temperature Dependence of Valley Dynamics in a Six-fold Degenerate Si-(111) 2DEG TOMASZ M. KOTT, University of Maryland, College Park, BINHUI HU, University of Maryland, ROBERT N. MCFARLAND, BRUCE E. KANE, University of Maryland, College Park — Using a two-dimensional electron gas (2DEG) on hydrogen terminated Si-(111) surfaces, we have studied magnetic field dependent valley dynamics of this six-fold degenerate system [1]. High field (up to 12 T) magneto-transport measurements indicate field-dependent valley splitting from the nominally six-fold degenerate system. In a simple non-interacting picture, one would expect no odd filling factors; although crystal misorientation and strain can lead to $\nu = 2$ and 4, no such mechanism exists for $\nu = 1, 3, 5$ [2]. Our samples show easily resolvable filling factors of, amongst others, 3 and 5, as well as filling factor dependent resistance anisotropies which indicate possible many-body effects beyond the simple interaction-free model. I will show activation measurements of these filling factors, discuss the stability of the resulting energy gaps, and consider potential causes of the splitting. A comparison of these activation measurements across different densities ($n_s = 3 - 8 \times 10^{11} \text{ cm}^{-2}$) and samples of varying mobility (10,000 – 100,000 cm^2/Vs) will also be made. [1] R. N. McFarland et al., *Phys. Rev. B* **80** 161310R (2009), [2] K. Eng, R. N. McFarland, and B. E. Kane, *Phys. Rev. Lett.* **99**, 016801 (2007)

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