

Abstract Submitted  
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**Experimental investigation of the mobility/quality dichotomy in ultra-high quality AlGaAs/GaAs two-dimensional electron gases** QI QIAN, JAMES NAKAMURA, SAEED FALLAHI, GEOFFREY GARDNER, Purdue University, JOHN WATSON, Delft Technical University, SILVIA LUSCHER, JOSHUA FOLK, University of British Columbia, GABOR CSATHY, MICHAEL MANFRA, Purdue University — We detailed the relationship between mobility lifetime ( $\tau_{tr}$ ), and quantum scattering lifetime ( $\tau_q$ ) measured near zero magnetic field and the excitation gap ( $\Delta_{5/2}$ ) at  $\nu = 5/2$  in ultra-high quality AlGaAs/GaAs two-dimensional electron gases. While the lack of correlation between  $\tau_{tr}$  and  $\Delta_{5/2}$  has been noted previously, we demonstrate that  $\tau_q$  is also a poor predictor of  $\Delta_{5/2}$ . The impact of small density inhomogeneities on determination of  $\tau_q$  in the limit of very large  $\tau_q$  and low temperatures is discussed. We define, analyze and discuss the utility of a different metric  $\rho_{cf}$ , the so-called composite fermion resistivity, as a high temperature (T=0.3K) predictor of  $\Delta_{5/2}$ .

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