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Effect of perpendicular electric fields on quantum Hall stripe phases J. POLLANEN, J.P. EISENSTEIN, Condensed Matter Physics, California Institute of Technology, L.N. PFEIFFER, K.W. WEST, Department of Electrical Engineering, Princeton University — High quality two dimensional electron systems (2DES) in GaAs can exhibit large transport anisotropies near half filling of excited Landau levels [1,2] associated with the emergence of collective electron states possessing broken rotational symmetry in the plane of the 2DES. These states, known as the stripe phases, appear to be among the first known examples of purely electronic nematic liquid crystals. Experiments show that the orientation of the stripes is keyed to the crystallographic axes of the GaAs host lattice. Identification of the native symmetry-breaking potential remains an active area of interest, with strain and spin-orbit mechanisms recently proposed [3,4] as being responsible. Noting that both strain and spin-orbit effects can be altered by the application of a perpendicular electric field, we have performed magneto-transport experiments on narrow (20nm) GaAs quantum wells equipped with front and backside electrostatic gates. These gates allow us to study the effect, at constant 2D electron density, of perpendicular electric fields on the various quantum Hall stripe phases. [1]M.P. Lilly et al. PRL 82, 394 (1999) [2]R.R. Du et al. Solid State Commun. 109, 389 (1999) [3]S.P. Kovudayur et al. PRL. 106, 016804 (2011) [4]I. Sodemann and A.H. MacDonald, arXiv:1302.3896

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