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Undoped GaAs bilayers for exciton condensation experiments M.P. LILLY, J.A. SEAMONS, E. BIELEJEC, J.L. RENO, Sandia National Laboratories — Experimental progress in transport studies of exciton condensation of in electron and hole bilayers at high magnetic fields [1,2] has shown this novel physics can be observed. Fabrication of the bipolar electron-hole bilayers for zero field studies of exciton condensation still remains elusive. We describe a series of experiments on undoped GaAs/AlGaAs heterostructures with the motivation of making electron-hole bilayers. In these undoped devices, external electric fields induce carriers rather than the traditional doping techniques. Single layer electron (or hole) devices demonstrate a high mobility over a wide range of density. More recently, fully undoped bilayers have been made where the density in each layer is independently controlled with gates on the top and bottom of the bilayer. In this talk we present high field transport of undoped electron-electron bilayers, and describe recent progress towards extending the fabrication techniques to creating electron-hole bilayers for exciton condensation studies at zero magnetic field. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000. 1. M. Kellogg, J. P. Eisenstein, L. N. Pfeiffer, and K. W. West, Phys. Rev. Lett. 93 036801 (2004). 2. E. Tutoc, M. Shayegan, and D. A. Huse, Phys. Rev. Lett. 93, 036802 (2004).

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