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Surface Acoustic Wave Study of Exciton Condensation in Bilayer Quantum Hall Systems[1] J. POLLANEN, J.P. EISENSTEIN, Institute for Quantum Information and Matter and Department of Physics, California Institute of Technology, Pasadena, California 91125, USA, L.N. PFEIFFER, K.W. WEST, Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544, USA — In bilayer two-dimensional electron systems (2DES) in GaAs a strongly correlated many-electron state forms at low temperature and high magnetic field when the total electron density n_T becomes equal to the degeneracy of a single spin split Landau level. This state corresponds to a total filling factor $\nu_T = 1$ and can be described in terms of pseudospin ferromagnetism, or equivalently, Bose condensation of bilayer excitons. We have simultaneously measured magneto-transport and the propagation of pulsed surface acoustic waves (SAWs) at a frequency of 747 MHz to explore the phase transition between two independent layers at $\nu_T = 1/2 + 1/2$ and the correlated state at $\nu_T = 1$ in a high quality double quantum well device. We tune through this transition by varying the total electron density in our device with front and backside electrostatic gates.

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