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Melting Temperatures of 2D Electron Solids in the Lowest Landau Level from Microwave Spectroscopy Y.P. CHEN, Princeton U., S. GANAPATHY, NHMFL, R.M. LEWIS, U.Maryland, L.W. ENGEL, NHMFL, D.C. TSUI, Princeton U., Z.H. WANG, Princeton U., P.D. YE, Agere Systems, L.N. PFEIFFER, Bell Labs, K.W. WEST, Bell Labs — We studied the temperature(T) dependence of the microwave conductivity spectra of two dimensional electron systems in the high magnetic field (B) insulating phase (HBIP) for Landau filling factor $\nu<\sim 1/5$. Such an insulating phase, believed to be a pinned electron solid, supports a characteristic pinning resonance in the conductivity spectrum. Two samples were studied. Sample 1 is a heterojunction with density $n\sim 7\times 10^{10}\mathrm{cm}^{-2}$ and mobility $\mu\sim 5\times 10^{6}\mathrm{cm}^{2}/\mathrm{Vs}$ and has a single resonance in the HBIP. Sample 2 is a 65nm-wide QW with $n\sim 6\times 10^{10}\mathrm{cm}^{-2}$ and $\mu\sim 10\times 10^{6}\mathrm{cm}^{2}/\mathrm{V}$ and was recently found to have two resonances in the HBIP, interpreted as corresponding to two different solid phases, with one crossing over to the other as ν is reduced [1]. We studied the higher-T behavior of the resonances at many different combinations of n (through backgating) and B, and measured the characteristic temperatures T_c at which the resonances disappear. We foundT_c is a non-increasing function of ν for either sample, although the function differs significantly for both samples. We interpret T_c as the melting temperature of the electron solid(s) to a quantum liquid, for which ν captures the importance of inter-electron quantum correlation. [1] Y.P. Chen et al., Phys.Rev.Lett. 93, 206805 (2004)

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