

Abstract Submitted
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Microwave spectroscopic observation of multiple phase transitions in the bilayer electron solid in wide quantum wells ANTHONY HATKE, LLOYD ENGEL, NHMFL, YANG LIU, MANSOUR SHAYEGAN, LOREN PFEIFFER, KEN WEST, KIRK BALDWIN, Princeton University — The termination of the low Landau filling factor (ν) fractional quantum Hall series for a single layer two dimensional system results in the formation of a pinned Wigner solid for $\nu < 1/5$ [1]. In a wide quantum well the system can support a bilayer state in which interlayer and intralayer interactions become comparable, which is measured in traditional transport as an insulating state for $\nu < 1/2$ [2]. We perform microwave spectroscopic studies of this bilayer state and observe that this insulator exhibits a resonance, a signature of a solid phase. Additionally, we find that as we increase the density of the well at fixed ν this bilayer solid exhibits multiple sharp reductions in the resonance amplitude vs ν . This behavior is characteristic of multiple phase transitions, which remain hidden from dc transport measurements.

[1] Lozovik and Yudson, JETP Lett. 22, 11 (1975).

[2] Manoharan et al., Phys. Rev. Lett. 77, 1813 1996).

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