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Microwave spectroscopy as a probe of the interaction between a Wigner solid and composite fermion liquid ANTHONY HATKE, LLOYD ENGEL, National High Magnetic Field Laboratory, YANG LIU, HAO DENG, MANSOUR SHAYEGAN, LOREN PFEIFFER, KEN WEST, KIRK BALDWIN, Department of Electrical Engineering, Princeton University — For a two dimensional electron system containing a single occupied subband the fractional quantum Hall effect (FHQE) series terminates at filling factor $\nu = 1/5$. For $\nu < 1/5$ the system forms a Wigner solid, pinned by residual disorder, which exhibits a resonance in its microwave spectrum due to pieces of the solid oscillating within the disorder potential. Here we perform microwave spectroscopy measurements of a unique double quantum well (DQW). This DQW was grown to have a high mobility, relatively high density in the majority layer that exhibits a number of well-known FQHE states for $\nu < 1$ and a minority layer with a relatively low density such that at over the range of observable FQHE states in the majority layer the minority layer will form a Wigner solid. Our microwave spectroscopy measurements are sensitive to the solid formed in the minority layer and probe the interaction between the Wigner solid and the composite fermion liquid. We find that the peak frequency of the pinning mode resonance oscillates with the majority-layer filling due to FQHE states and discuss our observations in terms of the formation of a Wigner solid comprised of image charges in the majority layer.

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