

Abstract Submitted
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Exploring a dipolar Luttinger liquid from the Tonks to the super-Tonks regimes KUAN-YU LI, WIL KAO, KUAN-YU LIN, BENJAMIN LEV, Stanford University — A wide range of exotic quantum many-body phases and nonequilibrium dynamics may arise from the unusual properties of highly magnetic dysprosium confined to one dimension. We have previously explored the controlled breakdown of integrability in a dipolar quantum Newton's cradle created using the controllability of the dipolar interaction in 1D-confined dysprosium. Here, we report new work on exotic equilibrium properties of 1D dysprosium gases. We observe a dipolar confinement induced resonance and use it to create a dipolar Luttinger liquid in both the Tonks and super-Tonks regimes. We present results characterizing this resonance as well as collective oscillation measurements that reveal these regimes.

Kuan-Yu Li
Stanford University

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