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Fractional Quantum Hall Effects in a Two-Dimensional Atomic Gas JIANSHI ZHAO, LOUIS JACOME, NATHAN GEMELKE, The Pennsylvania State University — Fractional Hall effects in two-dimensional electron gases have dramatically altered the way we look at ordering in quantum many body systems. Despite heroic advances since their discovery, many predictions regarding unique behavior have yet to be observed. We describe new efforts to produce similar effects in cold atomic Bose gases. Previous experiments have observed strong correlation in large ensembles of rapidly rotating few body samples consistent with a description using bosonic analogues of fractional hall states. We describe extensions of these experiments to observe individual systems in a quantum gas micropscope, introduce strong interactions through Feshbach resonance, and extend effects to larger numbers of atoms. The use of impurity atoms to probe fractional hall droplets will also be discussed, as will the extension of these effects to higher spin samples by using multiple internal states of Rubidium-87.

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