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# Few-body Atomic Systems in the Fractional Quantum Hall Regime

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The fractional quantum hall (FQH) effect in two-dimensional electron gases represents a unique phenomenon in nature, combining aspects of strongly correlated electron gases with the statistical and topological effects unique to dimensionally reduced systems. I will discuss our attempts to generate motionally entangled states in small clusters of Bosonic atoms closely analogous to those occurring in the electronic FQH effect. By constructing an optical lattice of spinning and precisely controlled on-site potentials, small clusters of interacting atoms can be adiabatically transferred from uncorrelated states at zero angular momentum through a tabulated sequence of ground state level crossings with increasing atomic correlation and total angular momentum. Results will be shown probing these states with both time-of-flight techniques and by directly interrogating atomic correlation via photo-association to excited molecules. Comparison is made to numeric models with no free parameters. Finally, implications of these results will be presented for future experiments in the FQH regime, both probing unique features of these states, and generalizing the methods to produce macroscopic systems in the FQH limit.