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Exploring Fractional Quantum Hall Effect in Ultracold Strontium Atomic Gases XIBO ZHANG, WEI QI, MINGCHENG LIANG, ICQM, Peking University — Ultracold atomic gases in the fractional quantum Hall (FQH) regime hold promise for providing new paths to exotic anyonic excitations. Realizing such atomic systems, however, has been hindered by difficulties in suppressing heating and loss problems due to spontaneous emission and in preparing and manipulating ultracold samples with very small atomic numbers. Owing to its ultra-narrow clock transition, ^{87}Sr has become a promising candidate to overcome these difficulties. We describe progress in building an apparatus that uses Raman optical lattices with novel configurations to engineer synthetic gauge fields for ultracold Sr and induce non-trivial topological flatbands. High-spatial-resolution microscopy and precision coherent spectroscopy can be combined to prepare and characterize strongly correlated states and their physical properties.

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