Rapid preparation and characterization of low entropy SU(N) Fermi gases LINDSAY SONDERHOUSE, CHRISTIAN SANNER, ROSS B. HUTSON, AKIHISA GOBAN, LINGFENG YAN, WILLIAM R. MILNER, THOMAS BILITEWSKI, ANA MARIA REY, JUN YE, University of Colorado, Boulder —
We use ^{87}Sr atoms to study a deeply degenerate Fermi gas under SU(N) symmetry, where N can be as large as 10. We demonstrate enhanced interactions in a 3D ^{87}Sr degenerate gas. Using all 10 spin states during evaporation allows us to have efficient sample preparation while reaching deep degeneracy, with $T/T_F = 0.07$ in under 3 s. We also characterize the SU(N) gas by observing anisotropic expansion in time-of-flight and by examining density fluctuations in the gas. We show that SU(N) symmetric interactions significantly modify the behavior of a non- interacting Fermi gas and need to be accurately accounted for to extract thermodynamic properties.

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