Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Interplay between Kondo screening and local singlets in $SU(N)$-symmetric cold atoms[1] LEONID ISAEV, ANA MARIA REY, JILA, NIST and Department of Physics, University of Colorado, Boulder, CO, USA — We study collective phenomena in strongly interacting fermionic alkaline-earth atoms (AEAs) loaded in an optical lattice. Owing to the strong decoupling between electronic orbital and nuclear-spin degrees of freedom, AEAs prepared in the two lowest electronic states are predicted to obey an accurate $SU(N > 2I + 1)$ symmetry in their two-body collisions (I is the nuclear spin). The $SU(N)$ symmetric models offer a great opportunity to generate exotic many-body behavior emerging from the increased degeneracy and strict conservation laws. We focus on a parameter regime that realizes an $SU(N > 2)$ (Coqblin-Schrieffer) generalization of the usual Kondo lattice model, and show that for band fillings above one atom per site, the system exhibits a peculiar interplay between Kondo screening and formation of singlets between localized atoms. In the limit of large Kondo coupling, we derive an effective Hamiltonian and determine its phase diagram. Our results can be tested in experiments with ultracold ^{173}Yb or ^{87}Sr atoms and are relevant for the physics of heavy-fermion materials with magnetic frustration.

[1]Supported by AFOSR, MURI-AFOSR and NSF.

Leonid Isaev
JILA, NIST and Department of Physics,
University of Colorado, Boulder, CO, USA

Date submitted: 14 Nov 2014 Electronic form version 1.4