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**Exact solution of SU(4) Kondo Lattice Model for ultracold alkaline-earth atoms** SOLOMON F. DUKI, HONG LING, Department of Physics and Astronomy, Rowan University, 201 Mullica Hill Road, Glassboro, New Jersey 08028 — The recent progress in ultracold atomic physics has greatly spurred the activities aimed at using cold atoms in optical lattices as a unique platform to explore condensed matter phenomena in a highly controlled manner. For alkaline-earth atoms, there is an almost perfect decoupling of the nuclear spin from the electronic angular momentum in both the ground and the metastable states [A. V. Gorshkov et al., nature 6, 289 (2010)]. This along with the existence of relatively high nuclear spin degrees of freedom makes the cold alkaline-earth atoms an excellent candidate that one can employ to study Kondo effects with higher SU(N) spin degrees of freedom. In this work we study a mixture of two-component fermionic alkaline-earth atoms loaded in external optical lattice potentials that directly emulates the Lattice Kondo Model under suitable conditions. Using a combination of bosonization and canonical transformation, we find, for a model with SU(4) symmetry, a solvable point where the Hamiltonian of the system can be exactly diagonalized. To characterize the system, we calculate the correlation functions that are accessible by experiments such as time-of-flight.

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