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Degenerate Fermi Gas of Strontium-87[1]

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Degenerate Fermi gases of alkaline earth metal atoms such as strontium and ytterbium open new possibilities in the study of many-body physics because of the existence of isotopes with large nuclear spin I (e.g. I=9/2 in strontium-87). With the closed-shell electronic ground state in these atoms, the nuclear spin is decoupled from other degrees of freedom. Interactions between atoms are spin-independent, leading to a large SU(N=2I+1) symmetry of the Hamiltonian. This results in a large degeneracy of the ground state, which has been predicted to result in novel spin liquid and valence bond states. Strong attractive interactions would favor formation of N-particle singlets, in analogy to the formation of baryons in quantum chromodynamics. (For a short overview, see C. Wu, *Physics* **3**, 92 (2010).) We will describe the experimental realization of a degenerate Fermi gas of strontium-87 and characterization of an optical Feshbach resonance in this system that would be needed to manipulate the atom-atom interactions.

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