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Certain cold atoms, namely the alkaline earth-like atoms whose electronic degrees of freedom are decoupled from their nuclear spin, can be thought of as quantum particles with an SU(N)-symmetric spin. These have recently been cooled to quantum degeneracy in the laboratories around the world. A new world of SU(N) physics has thus become accessible to experiment, including that described by the SU(N) Hubbard model in various dimensions as well as many others. We show that the Mott insulator of such cold atoms is a SU(N) symmetric antiferromagnet of the type not commonly studied in the literature. We further show that in 2 dimensions, this antiferromagnet is a chiral spin liquid, a long sought-after topological state of magnets, with fractional and non-Abelian excitations.

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