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A Quantum Dipolar Spin Liquid NORMAN YAO, Department of Physics, UC Berkeley, MICHAEL ZALETEL, Station Q, Microsoft Research, DAN STAMPER-KURN, ASHVIN VISHWANATH, Department of Physics, UC Berkeley
— Quantum spin liquids are a new class of magnetic ground state in which spins are quantum mechanically entangled over macroscopic scales. Motivated by recent advances in the control of polar molecules, we show that dipolar interactions between S=1/2 moments stabilize spin liquids on the triangular and kagome lattices. In the latter case, the moments spontaneously break time-reversal, forming a chiral spin liquid with robust edge modes and emergent semions. We propose a simple route toward synthesizing a dipolar Heisenberg antiferromagnet from lattice-trapped polar molecules using only a single pair of rotational states and a constant electric field.

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