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Title: Quantum Electrodynamics in 2+1 Dimensions as the Organizing Principle of a Triangular Lattice Antiferromagnet

Abstract: Quantum electrodynamics in 2+1 dimensions (QED3) has been proposed as a critical field theory describing the low-energy effective theory of a putative algebraic Dirac spin liquid or of quantum phase transitions in two-dimensional frustrated magnets. We provide compelling evidence that the intricate spectrum of excitations of the elementary but strongly frustrated J1-J2 Heisenberg model on the triangular lattice is in one-to-one correspondence to a zoo of excitations from QED3, in the quantum spin liquid regime. This includes a large manifold of explicitly constructed monopole and bilinear excitations of QED3, which is thus shown to serve as an organizing principle of phases of matter in triangular lattice antiferromagnets and their low-lying excitations. Our results are obtained by comparing ansatz wave functions from a parton construction to exact eigenstates obtained using large-scale exact diagonalization up to N=48 sites.