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Detecting non-magnetic excitations in quantum magnets[1] ZHIHAO HAO, Department of Physics and Astronomy, University of Waterloo — Many unconventional quantum phases host special non-magnetic excitations such as photons and visons. We discuss two possible ways to detect these excitations experimentally. Firstly, spin-lattice coupling mixes the excitations with phonons. The phonon spectral function acquires new features that can be detected by neutron or X-ray scattering. Secondly, valence-bond fluctuations translate into charge density fluctuations on non-bipartite lattices. Such charge fluctuations can be characterized by conventional spectroscopies such as Terahertz spectroscopy. Observation of exotic singlet excitations would provide positive identification of unconventional quantum phases in frustrated antiferromagnets.

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