

Level repulsion in quantum magnets

December 2 2015

Neutron measurements at Oak Ridge National Laboratory's Spallation Neutron Source are giving physicists new insight into the behavior of quantum magnets. A research team led by Young-June Kim from the University of Toronto used neutron spectroscopy to observe a novel type of energy band repulsion in a magnetic insulator.

The study adds to scientists' understanding of quasiparticles, a theoretical concept that describes many [particle interactions](#) inside a material. "One general rule for quasiparticles is that energy levels or bands don't like to intersect – what's known as level repulsion," said ORNL coauthor Garrett Granroth. "In this paper, we show a specific example of a level repulsed by a continuum of states in a quantum magnet, which hasn't been seen before."

Understanding the intricate magnetism of this material may help researchers predict analogous behavior in other complex systems such as superconductors. The team's results are published in *Nature Physics*.

More information: K. W. Plumb et al. Quasiparticle-continuum level repulsion in a quantum magnet, *Nature Physics* (2015). [DOI: 10.1038/nphys3566](https://doi.org/10.1038/nphys3566)

Provided by Oak Ridge National Laboratory

Citation: Level repulsion in quantum magnets (2015, December 2) retrieved 10 April 2024 from

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