

Submillimeter-wave ESR Study on Quantum Spin Systems

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Various types of quantum spin systems have been studied by submillimeter wave ESR technique. In $\text{SrCu}_2(\text{BO}_3)_2$, it has been observed that many kinds of "multiple-triplet" excitations appear and this feature has been explained as the extreme localization of the excited states in the Shastry and Sutherland model. These localized excitations change to the spin-wave like mode, when the energy gap is collapsed in high magnetic field. For Cubenzoate, a distinct anomaly was found in the temperature dependence of the line width. Absence of the three dimensional ordering indicates that the anomaly is caused by the change of the spin dynamics, and it has been discussed in term of the "breather" picture recently proposed by Oshikawa and Affleck. The present results highlight the important role of ESR for the investigation of magnetic excitation in quantum spin systems, especially for high magnetic fields.

KEYWORDS: ESR, magnetic excitation, high magnetic field, quantum spin