PS04

Consideration on field-induced phase transition in a disordered quantum spin system $Y_2BaNi_{1-y}Mg_yO_5$

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Quantum spin systems show a variety of phases, as electron systems do. Analogies between both types of systems often work quite well. Gapped spin singlet system corresponds to gapped insulator for electron system. Triplet bozons (magnons) doped into gapped spin system show Bose-Einstein condensation (BEC) at low temperatures if the bozons have large transfer between magnetic sites, as the doped electrons condense into superconducting state in some cases. The doped triplet bozons are arranged in superlattice periodicity if the repulsion of the bozons is large, as some of strongly correlated electron systems show charge ordering. Such bozon ordering is observed as magnetization plateau and magnetic ordering with superlattice periodicity. In this presentation, we will show experimental results on field-induced phase transition in a disordered quantum magnet $Y_2BaNi_{1-y}Mg_yO_5$, and discuss a possible analogy between this phase transition and superconducting transition in disordered thin films of superconductor. In ESR spectra of the former, signals from finite chains of each length cut by Mg are separated well, indicating that eigenstates are confined on each finite chain, but are not widespread over the crystal. This situation would correspond to the localized states in the latter. The ordered state in the former is expected similar to BEC state in other gapped quantum spin systems discovered so far, which would correspond to the superconducting state in the latter.