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$Ba_3Cr_2O_8$, a new non-Cu based quantum s=1/2 spin singlet system

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Field-induced condensation of magnons has been experimentally observed in several weakly coupled quantum ($s = 1/2$) dimer systems that are based on Cu^{2+} ions, such as $TlCuCl_3$ and $BaCuSi_2O_6$, and it has been adequately described by the Bose-Einstein condensation (BEC) theory. However, the robustness of such descriptions can only be truly evaluated with investigation into complementary materials, in particular materials that are based on non-Cu^{2+} ions. Recently, a new spin dimer system, Ba3Cr2O8 has been found, where Cr^{5+} ($s = 1/2$) ion with the unusual 5+ electronic valence forms quantum dimers along the *c*-axis and a frustrating triangular lattice in the *ab*-plane. Using elastic and inelastic neutron scattering measurements on single crystals and a powder sample, we have characterized the magnetic interactions to show that $Ba_3Cr_2O_8$ is indeed an excellent model system of weakly coupled quantum dimers [1]. We have also investigated the field-induced condensation of magnons in this compound, using specific heat, bulk magnetization, and elastic neutron scattering measurements under an external magnetic field. The experimental results and comparison to the theories will be discussed. *This work is in collaboration with J.-H. Kim, S. Ji, S.-H. Lee (University of Virginia), H. Ueda, Y. Ueda (ISSP, University of Tokyo), H. Nojiri (IMR, Tohoku University), B. Lake, K. Rule (Helmholtz Centre Berlin).

[1] M. Kofu *et al.*, cond-mat/0809.5069 (2008).