Field-induced Bose-Einstein Condensation of triplons up to 8 K in Sr$_3$Cr$_2$O$_8$\textsuperscript{1} A.A. ACZEL, McMaster University, Y. KOHAMA, C. MARCENAT, Los Alamos National Laboratory, F. WEICKERT, Max Planck Institute for Chemical Physics of Solids, M. JAIME, O.E. AYALA-VALENZUELA, R.D. MCDONALD, Los Alamos National Laboratory, S.D. SELESNIC, H.A. DABKOWSKA, G.M. LUKE, McMaster University — Single crystals of the spin dimer system Sr$_3$Cr$_2$O$_8$ have been grown for the first time. Magnetization, heat capacity, and magnetocaloric effect data up to 65 T reveal magnetic order between applied fields of $H_{c1} \sim 30.4$ T and $H_{c2} \sim 62$ T. This field-induced order persists up to $T_{c}^{\text{max}} \sim 8$ K at $H \sim 44$ T, the highest observed in any quantum magnet where $H_{c2}$ is experimentally-accessible. We fit the temperature-field phase diagram boundary close to $H_{c1}$ using the expression $T_c = A(H-H_{c1})^\nu$. The exponent $\nu = 0.65(2)$, obtained at temperatures much smaller than $T_{c}^{\text{max}}$, is that of the 3D Bose-Einstein condensate (BEC) universality class. This finding strongly suggests that Sr$_3$Cr$_2$O$_8$ is a new realization of a triplon BEC where the universal regimes corresponding to both $H_{c1}$ and $H_{c2}$ are accessible at $^4$He temperatures.

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