SYNTHESIS, CRYSTAL STRUCTURE & TORQUE MEASUREMENT ON MIXED ALKALI METAL PEROXYCHROMATES: NEW CANDIDATES FOR QUANTUM CRITICAL PHENOMENON

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Mixed alkali metal peroxychromate, [1, 2] K_2NaCrO_8 is the first example of Cr^{5+}-based material ($3d^1$, S=1/2, 90.5%, I=0) with a clearly defined antiferromagnetic transition at T_N=1.66 K. Magnetization results show saturation at 7.270 T. This accessible saturation field makes it a suitable candidate for magnetic field induced quantum phase transition.[3, 4] In order to investigate the role of the cations in quantum criticality parameters, we have synthesized Rb_2NaCrO_8. Chemical structures were determined by x-ray diffraction. Torque measurements using a ultra sensitive piezoresistive cantilever were made down to 20 millikelvin temperature and function of crystal orientation to determine a preliminary phase diagram along with the identification of a new spin-flop like peak in both compounds. The details of the experimental work and the phase diagrams of the two compounds will be discussed in this presentation.

References:

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