Abstract Submitted
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Spin re-orientation in heavy fermion system $\alpha - YbAl_{1-x}Fe_xB_4$[1] SHAN WU, C. BROHOLM, Johns Hopkins Univ, K. KUGA, SHINTARO SUZUKI, S. NAKATSUJI, ISSP, Japan, M. MOURIGAL, Georgia Tech, M. STONE, WEI TIAN, ORNL, Y. QIU, JOSE RODRIGUEZ-RIVERA, NCNR — Non centro-symmetric $\alpha - YbAlB_4$ has a heavy Fermi liquid ground state and shares many characteristics with centro-symmetric $\beta - YbAlB_4$. Both isomorphs display intermediate valence, associated with a fluctuation scale of $T_0 = 200$ K and a Kondo lattice scale of $T^* = 8$ K[1]. Unlike $\beta - YbAlB_4$, $\alpha - YbAlB_4$ is at the boundary of a transition from a Fermi liquid metallic state to an antiferromagnetic (AFM) insulating state, driven by Fe substitution of Al [2]. Magnetization and specific heat measurements reveal two different antiferromagnetic phases with $T_N = 9$ K and $T_N = 2$ K for Fe concentration above and below x=0.07. We report single crystal neutron scattering experiments on Fe doped $YbAlB_4$ with x=0.035 and x=0.125. While the ordering wave vector is identical,$\vec{k} = (1, 0, 0)$, the spin orientation switches from c to a with increasing Fe concentration. This suggests different anisotropic hybridization between 4f and conduction electrons that we confirmed by determining the crystal field levels. [1] M. Okawa et al., PRL 104, 247201 (2010) [2] K. Kuga, S. Nakatsuji PRB 86, 224413 (2012)

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