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Magnetic Excitations in Cr-Ru Superconducting Alloy MEHMET RAMAZANOGLU, Ames Lab, ROBERT J. MCQUEENEY, THOMAS A. LOGRASSO, DEBORAH L. SCHAGEL, Ames Lab. Iowa State Univ., IA, ANDREAS KREYSSIG, ALAN I. GOLDMAN, Ames Lab., Iowa State Univ., IA, DANIEL PRATT, JEFFREY W. LYNN, NCNR, NIST, MD, GARRETH GRANROTH, ORNL, TN — We have studied the spin fluctuations in the normal state of a cubic superconductor $Cr_{(1-x)}Ru_x$ for x=0.2. The electron doping created by Ru ions in $Cr_{(1-x)}Ru_x$ monotonically decreases the antiferromagnetic (AFM) spin density wave (SDW) transition temperature, T_N. As the Ru fraction increases through x=0.17 [1], the long-range SDW order is completely suppressed and the alloy becomes a superconductor. We have conducted a series of inelastic neutron scattering (INS) experiments with Ru concentration of x=0.2 with a superconducting transition temperature of Tc $\sim$1.6 K. The SDW fluctuations are found to be commensurate with the magnetic propagation vector of Q_{AFM} =(100). At high energy transfers, the strong spin fluctuations appearing near Q_{AFM} reach beyond dE=120 meV, not unlike metallic Cr, where spin excitations are very energetic and can reach up to several hundreds of meV [2]. These excitations are also found to be down to energies of dE=2 meV. We discuss the possibility that superconductivity found in the Cr-Ru alloy system is unconventional.

[1] K. Chatani and Y. Endoh, J. Phys. Soc. Of Jpn, 72 , 17 , (2003)
[2] E. Fawcett, et. al. Rev. Mod. Phys. 66, 25 (1994)

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