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Low-temperature spin excitations in $Ba(Fe_{0.972}Cu_{0.028})_2As_2$ single crystals M.G. KIM, A. KREYSSIG, D.K. PRATT, Ames Laboratory and Iowa State University, K.J. MARTY, M. D. LUMSDEN, Oak Ridge National Laboratory, W. TIAN, J. ZARESTKY, Ames Laboratory, S. NANDI, A. THALER, N. NI, S.L. BUD'KO, P.C. CANFIELD, R.J. MCQUEENEY, A.I. GOLDMAN, Ames Laboratory and Iowa State University — We report on inelastic neutron scattering measurements of low temperature spin excitations in the non-superconducting $Ba(Fe_{0.972}Cu_{0.028})_2As_2$ compound that orders antiferromagnetically at $T_N = 62(1)$ K. These results are compared to $Ba(Fe_{0.953}Co_{0.047})_2As_2$, a compound that has a similar Neel temperature, but is superconducting below 17 K. Since the normal state spin fluctuations can possibly mediate superconducting pairing, it is interesting to compare the two compounds, considering that one is a superconductor and the other is not. While differing in some details, the spin excitation spectra for the Cu-doped and Co-doped samples are qualitatively similar, and can be understood as strongly damped spin waves. Given the similar spin excitations, additional factors must be considered to explain why the Cu-doped compound is not a superconductor. – The work at the Ames Laboratory was supported by the US DOE, Office of Science, under contract No. DE-AC02-07CH11358. The work at ORNL was supported by the Scientific User Facilities Division, Office of Basic Energy Sciences, US DOE.

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