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Neutron Scattering Experiment on Doping Dependence of Spin Excitations in Superconducting $BaFe_{2-x}Ni_xAs_2$ SHILIANG LI, Chinese Academy of Science, JUN ZHAO, PENGCHENG DAI, U of Tennessee, SONGXUE CHI, JEFFREY LYNN, NIST, CHENGLIN ZHANG, U of Tennessee, HUIQIAN LUO, MENG WANG, Chinese Academy of Science, SUNG CHANG, DEEPAK SINGH, NIST — Understanding the interplay between spin fluctuation and superconductivity in high transition temperature (Tc) superconductors is important because spin fluctuations may mediate electron paring for superconductivity. In copper-oxide based superconductor (cuprates), resonance modes are found at antiferromagnetic (AF) ordering vector Q = (1/2, 1/2), which are dispersionless along the c-direction and directly coupled to Tc. In the FeAs-based superconductors, although the energies of the spin resonance are also proportional to Tc, our recently experiments found that the resonance has c-axis dispersion and display distinct energies at Q_z=0 and 1. In this paper, we use inelastic neutron scattering to study electron-doping dependence of the resonance energy in underdoped and overdoped superconducting $BaFe_{2-x}Ni_xAs_2$ (x=0.075, 0.15). We find that there exists similar energy dispersion in both underdoped and overdoped samples, suggesting that the c-axis coupling in $BaFe_{2-x}Ni_xAs_2$ is weakly doping dependent. We discuss the microscopic origin for such behavior.

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