

Abstract Submitted  
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**Nature of magnetic excitations in the electron-doped superconductor  $\text{BaFe}_{2-x}\text{Ni}_x\text{As}_2$** <sup>1</sup> HUIQIAN LUO, XINGYE LU, MENG WANG, Institute of Physics, Chinese Academy of Sciences, PENGCHENG DAI, Rice University — Inelastic neutron scattering experiments are extensively carried out on electron doped  $\text{BaFe}_{2-x}\text{Ni}_x\text{As}_2$  single crystals. The effect of electron doping was found to modify spin waves in the parent compound below  $\sim 100$  meV and induce a neutron spin resonance at the commensurate AF ordering wave vector that couples with superconductivity. Our careful temperature dependent study of the resonance reveals that the resonance suddenly changes its Q width below  $T_c$  and disperses with increasing energy. Upon further electron doping, the resonance becomes weaker and transversely incommensurate at all energies, while spin excitations above  $\sim 100$  meV are still not much affected. Together with RPA calculation, we conclude that the low energy spin excitations are more likely dominated by itinerant magnetism originating from Fermi surface nesting. In the heavily electron doping  $x=0.3$ , the low energy spin excitations are totally gapped out below 50 meV. The whole spin spectrum reveal that the low-energy spin excitation coupling with itinerant electron is important for superconductivity, even though the high-energy spin excitations are weakly doping dependent.

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