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NMR Evidence for Two Spin-Fluctuation Components and their Linear Scaling with Superconductivity in Fe Superconductors WEIQIANG YU, B. NORMAND, LONG MA, J. DAI, G.F. JI, P. FAN, P.S. WANG, Renmin University, Beijing, Y. SONG, C.L. ZHANG, PENGCHENG DAI, Rice University, Houston — The relationship between spin fluctuations and superconductivity is one of the most fundamental questions in the study of iron-based superconductors. From a series of NMR measurements on different compounds and over wide ranges of temperature [1] and pressure [2], we have found strong evidence for two different components contributing to spin fluctuations in the normal state. One originates from Fermi-surface electrons and appears at low energies, while the other arises from the local magnetic moments and appears at higher energy scales [1]. In $NaFe_{1-x}Co_xAs$, NMR studies demonstrate that both low-energy spin fluctuations and superconductivity are at first enhanced strongly under pressure, both scaling linearly, but decrease together above 2.2 GPa. A "missing constant" contribution to T_c reveals the additional effect of the local spin fluctuations. This clear evidence for (i) separate itinerant and local spin fluctuations and (ii) the scaling between spin fluctuations and superconductivity provide essential input to support a magnetic origin of superconductivity based on a two-component model for spin fluctuations in Fe superconductors.

[1] L. Ma *et al.*, PRB **84**, 220505(R) (2011).
[2] G. F. Ji *et al.*, PRL **111**, 107004 (2013).

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