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Spin Dynamics and Local Inhomogeneity in Doped $A\text{Fe}_2\text{As}_2$ ($A = \text{Ca}, \text{Ba}$)

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We report ⁷⁵As Nuclear Magnetic Resonance (NMR) data in CaFe_2As_2 , $\text{Ba}(\text{Fe},\text{Co})_2\text{As}_2$ and $\text{Ba}(\text{Fe},\text{Ni})_2\text{As}_2$. The static hyperfine field in the antiferromagnetic state is a direct probe of the sublattice magnetization, which decreases with Co or Ni doping. The spectra reveal a broad distribution of local internal fields, consistent with spatial inhomogeneity associated with the dopants. The spin lattice relaxation rate is highly sensitive to the presence of dopants and/or impurities, and reveals the presence of enhanced antiferromagnetic fluctuations with increasing doping. In the antiferromagnetic state, we find that the relaxation is driven by low energy magnon excitations. CaFe_2As_2 exhibits an unexpected peak in the spin lattice relaxation rate at 10K that may be driven by glassy dynamics associated with interplanar coupling between different magnetic domains.

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