# Nuclear Singlet States in Solution NMR

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The lifetime of nuclear singlet often exceeds the conventional relaxation time $T_1$ by an order of magnitude or more. In once case ($^{15}$N-labelled nitrous oxide in solution) the singlet lifetime is around 26 minutes. I will discuss some of the basic principles of singlet NMR, including how nuclear singlet states are generated, maintained, and observed, and show some of our latest results. I will also discuss a novel experiment involving rf irradiation at extremely low frequency (around 8 Hz), in order to induce nuclear singlet-triplet transitions. We have used this technique to measure nuclear J-couplings with an accuracy approaching 1 mHz.

Background references:

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