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Combining Ultrafast NMR sequences and hyperpolarization by SABRE

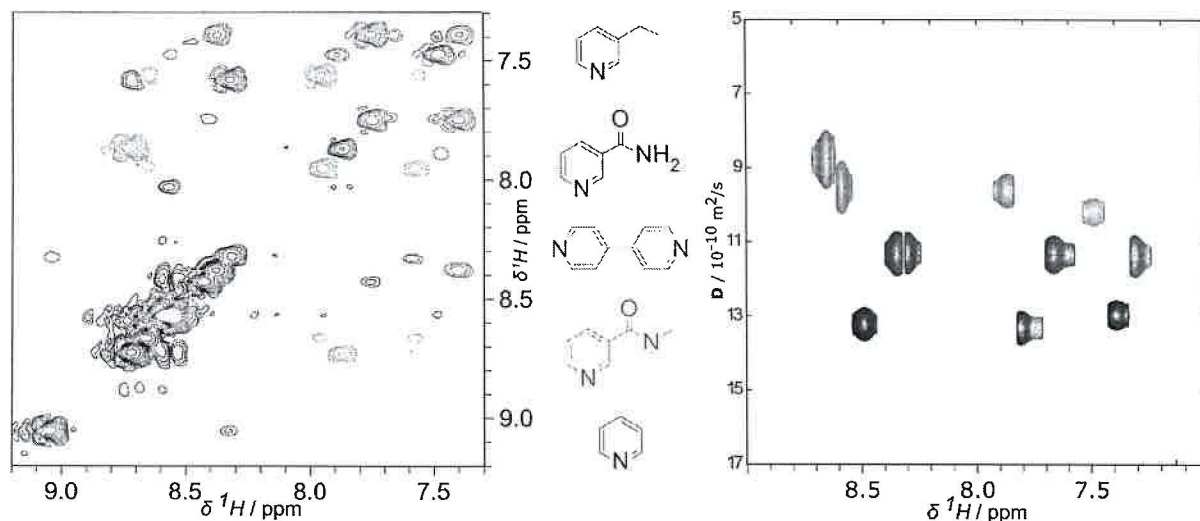
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Signal amplification by reversible exchange (SABRE) is a promising hyperpolarization method using parahydrogen to enhance the sensitivity of NMR experiments. However, SABRE-hyperpolarized NMR signals are short lived, particularly when ¹H is concerned, and therefore SABRE is often used to record 1D NMR spectra only. When the sample of interest is a complex mixture, this may result in severe spectral overlaps. Here, we describe approaches combining the concepts of SABRE-hyperpolarization [1] and spatially-encoded NMR [2] to obtain clean and sensitive COSY[3] and DOSY[4] spectra of mixtures of small molecules in a single scan. These schemes, respectively displayed on the left and right parts of the Figure, can be used for fast separation of components in a mixture.



[1] R. W. Adams et al., *Science*, 323, 1708 (2009).

[2] L. Frydman, T. Scherf, A. Lupulescu, *PNAS*, 99, 15858 (2002).

[3] V. Daniele, F.-X. Legrand, P. Berthault, J.-N. Dumez, G. Huber, *ChemPhysChem*, 16, 3413 (2015).

[2] L. Guduff, P. Berthault, G. Huber, J.-N. Dumez, *submitted*.