

## **A combined sparse sampling of time-gradient domain for NMR diffusometry and relaxometry**

**Mateusz Urbańczyk<sup>1\*</sup>, Wiktor Koźmiński<sup>1</sup>, Krzysztof Kazimierczuk<sup>2</sup>**

<sup>1</sup>Faculty of Chemistry, University of Warsaw, Warsaw, Poland

<sup>2</sup>Centre of New Technologies, University of Warsaw, Warsaw, Poland

\*murbanczyk@chem.uw.edu.pl

Multidimensional NMR spectra can provide an information on structures of large molecules or complex chemical mixtures. However, because of time-consuming sampling of a multidimensional signal, they require days-long data collection process. This problem has been to some extent circumvented by an application of various sparse sampling techniques. Nevertheless, they were limited to time dimensions of NMR spectra. In this work, we show how to extend sparse sampling to gradient dimensions. The procedure is based on a minimum  $\ell_1$ -norm restrained optimization using Fourier and inverted Laplace transforms. We demonstrate the performance of the algorithm on simulated and experimental data.