

# When the brain meets the sky: Compressed Sensing for Magnetic Resonance Imaging & Radio-Astronomy

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The discrete nature of radio interferometry measurements can be interpreted through the “Compressed Sensing” (CS) acquisition theorem, which supports the idea of using a specific mechanism, called sparsity, to reconstruct images from measured data called visibilities. In Magnetic Resonance Imaging (MRI), similar observations have been made leading to a new range of MRI imaging acquisition and reconstruction techniques. We will first briefly introduce CS and sparsity idea, then we will show how the resolution of a radio-astronomical image can be improved by a factor four compared to the state-of-art. Then we will present new MRI acquisition schemes developed for the NeuroSpin MRI instrument which will achieve 11.7 tesla this year. Using such CS acquisitions, associated to our astrophysical reconstruction methods, allows a significant acceleration of the MRI acquisition time. We present results on real MRI measurements.

**Authors:** STARK, Jean-Luc (CEA Saclay, CosmoStat laboratory); CIUCIU, Philippe (CEA Saclay, Neurospin)

**Presenters:** STARK, Jean-Luc (CEA Saclay, CosmoStat laboratory); CIUCIU, Philippe (CEA Saclay, Neurospin)

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