

Prospects for Compressed Sensing Reconstruction in Rotation Measure Synthesis

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I will describe the technique of Rotation Measure (RM) Synthesis for recovering polarisation images in Faraday Depth from multi-frequency radio data, and the parallels that exist with aperture synthesis. RM Synthesis will be a powerful tool for all pathfinder telescopes of the Square Kilometre Array (SKA), where it will be vital for magnetism science. I will contrast the prospects for different SKA pathfinders and describe the current development of the RM Synthesis pipeline of the LOFAR telescope in particular. Advanced imaging and deconvolution algorithms for recovery of Faraday Depth structure are a natural extension to these pipelines and I will highlight the applicability of compressed sensing techniques in the specific cases of single RM point sources such as pulsars, and for the recovery of so-called *Faraday Caustics* caused by rapid reversals of the magnetic field along the line of sight.