
LOFAR Sparse Image Reconstruction

Jean-Luc Starck^{*1}, Hugh Garsden[†], Stéphane Corbel[‡], Julien Girard[§], Cyril Tasse[¶],
and Arnaud Woiselle^{||}

¹CEA-Saclay (CEA) – CEA – SAP, CEA-Saclay, 91191 Gif-sur-Yvette, France

Résumé

Recent papers have established a clear link between the discrete nature of radio interferometry measurement and “compressed sensing” theory, which supports sparse recovery methods to reconstruct an image from the measured visibilities. We have implemented a sparse recovery method in the standard LOFAR imaging tools, allowing us to compare the reconstructed images from both simulation and real data to results obtained with classical methods such as CLEAN or MS-CLEAN. We show that i) sparse recovery performs as well as CLEAN in recovering the flux of point sources, ii) performs much better on extended objects, and iii) provides a solution with an effective angular resolution at least twice times better than the LOFAR CLEAN map.

*Intervenant

†Auteur correspondant: hugh.garsden@cea.fr

‡Auteur correspondant: stephane.corbel@cea.fr

§Auteur correspondant: julien.girard@cea.fr

¶Auteur correspondant: cyril.tasse@obspm.fr

||Auteur correspondant: arnaud.woiselle@cea.fr