5005-C1-2 **Jalal Fadili*** (Jalal.Fadili@greyc.ensicaen.fr), GREYC CNRS UMR 6072, ENSICAEN 6, Bd Marchal Juin, 14050 Caen, France, and **Jean-Luc Starck** (jstarck@cea.fr), DAPNIA/SEDI-SAP, CEA Saclay, 91191 Gif sur Yvette, France. *Morphological Diversity, Sparse Representations and some Inverse Problems.*

Sparse overcomplete representations are attracting interest in image processing theory, particularly due to their potential to generate sparse representations of data based on their morphological diversity. In this work, we consider a scenario of linear inverse problems where the image to be recovered can be sparsely represented in an overcomplete dictionary of sparse linear transforms. These transforms are chosen to offer a wider range of generating atoms; allowing more flexibility in image representation and adaptativity to its morphological content (texture, natural parts, etc). The linear inverse problem is formulated as the minimization of an energy functional with a sparsity-promoting regularization (e.g. ℓ_1 norm of the image representation coefficients). We will discuss theoretical aspects related to the optimization problem, and propose some fast iterative algorithms for its solution for which we establish convergence properties. A wide variety of examples ranging from deconvolution to inpainting are given to illustrate the potential applicability of the approach in image processing. (Received December 18, 2006)