5005-C1-22　　　　　**R. Gribonval*** (`remi.gribonval@irisa.fr`), Projet METISS, IRISA, Campus de Beaulieu, F-35042 Rennes, France, and **H. Rauhut**, **K. Schnass** and **P. Vandergheynst**. *Average case analysis of multi-channel sparse recovery using greedy algorithms.*

We analyze two greedy algorithms for simultaneous sparse approximation of multichannel signals over redundant dictionaries. The first one, p-thresholding, selects the atoms that have the largest p-correlation while the second one, p-simultaneous matching pursuit (p-SOMP), generalises an algorithm studied by Tropp. We first provide exact recovery conditions as well as worst case analyses of all algorithms. The results, expressed using the standard cumulative coherence, are reminiscent of the single channel case and impose stringent restrictions on the dictionary.

We unlock the situation by an average case analysis of both algorithms. We set up a probabilistic signal model where the coefficients of the atoms are drawn from a Gaussian distribution. Under this model, and with mild conditions on the coherence, we show that the probability that p-thresholding and p-SOMP fail to recover the correct components gets overwhelmingly small as the number of channels increases.

We further show that, if the dictionary satisfies a uniform uncertainty principle, the probability that simultaneous OMP fails to recover any sufficiently sparse set of atoms gets increasingly smaller as the number of channels increases. (Received May 04, 2007)