1063-15-285 **Blake A Hunter*** (blakehunter@math.ucdavis.edu), One Shields Ave., Davis, CA 95616, and **Thomas Strohmer** (strohmer@math.ucdavis.edu), One Shields Ave., Davis, CA 95616.

Performance Analysis of Compressive Spectral Clustering.

Compressed sensing is one of the fastest growing areas of active research, and spectral clustering is one of the most widely used techniques for extracting the underlying global structure of a data set. We combine the distance preserving measurements of compressed sensing with the power of spectral clustering. Our analysis provides rigorous bounds on how small errors in the affinity matrix can affect the spectral coordinates and clusterability. This work generalizes the current perturbation results of two-class spectral clustering to incorporate multiclass clustering with k eigenvectors. We thoroughly track how an initial error in the entries of the affinity matrix affects the entire spectral clustering process to the final step in applying k-means in the spectral coordinates. We show that instead of requiring the local distances be made in the large ambient dimension, measurements can be made on the order of the dimension of the hidden underlying point cloud structure. Using the controllable error from taking compressed sensing measurements, we establish perturbation bounds of the affinity matrix, the eigenvectors, the spectral coordinates and the clustering memberships. (Received August 18, 2010)