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**Debashis Paul\*** ([debashis@wald.ucdavis.edu](mailto:debashis@wald.ucdavis.edu)), 4222 Mathematical Sciences Building, One Shields Avenue, University of California, Davis, CA 95616. *Spike phenomena in some high-dimensional eigen-analysis problems*. Preliminary report.

We consider several statistical problems involving eigen-analysis for high-dimensional data. The first problem involves independent and identically distributed large-dimensional vectors with a covariance matrix that has a few eigenvalues separated from the rest. Here we describe a phase transition phenomenon for the larger sample eigenvalues and the corresponding sample eigenvectors. Next we consider a separable spatio-temporal covariance model with a few large eigenvalues for the “spatial” covariance. In this context we show that if the population eigenvalues exceed a certain threshold the corresponding sample eigenvalues and certain projections of the corresponding eigenvectors have asymptotically Gaussian behavior. We also consider a class of multi-dimensional time series for which similar phenomena take place. (Received February 24, 2007)