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Raj Rao Nadakuditi* (rajnrao@umich.edu), Department of EECS, 1301 Beal Avenue, Ann Arbor, MI 48109, and **Florent Benaych-Georges**. *Phase transitions in the eigenvalues and eigenvectors of perturbed random matrices.*

Motivated by applications in statistical signal processing and randomized numerical linear algebra, we consider the eigenvalues and eigenvectors of finite, low rank perturbations of random matrices. We uncover a remarkable phase transition phenomenon whereby the large matrix limit of the extreme eigenvalues of the perturbed matrix differs from that of the original matrix if and only if the eigenvalues of the perturbing matrix are above a certain critical threshold. This critical threshold is intimately related to the integral transforms of the spectral measure in a manner that we make explicit. Various extensions of our results are discussed. (Received February 09, 2010)