

AN INTRODUCTION TO THE STATISTICAL MECHANICS OF
RANDOM BAND MATRICES

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Random band matrices are a generalization of Wigner matrices in which the matrix elements are concentrated in a band about the diagonal. Spectral properties of these matrices can be expressed in terms of certain statistical mechanics models. The talk will start by discussing an elementary example corresponding to the Gaussian unitary ensemble. Then I shall describe a phase transition for a special supersymmetric model in 3D. This model is essentially equivalent to a random walk in a correlated random environment. The transition reflects a change in the long time behavior of this walk from localization to diffusion as the energy is varied.