

# Mathematical Physics, abstract math-ph/0403029

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## Eigenvalues of Hermite and Laguerre ensembles: Large Beta Asymptotics

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In this paper we examine the zero and first order eigenvalue fluctuations for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles, using the matrix models we described in [\[dumitriu02\]](#), in the limit as  $\beta \rightarrow \infty$ . We find that the fluctuations are described by Gaussians of variance  $O(1/\beta)$ , centered at the roots of a corresponding Hermite (Laguerre) polynomial. We also show that the approximation is very good, even for small values of  $\beta$ , by plotting exact level densities versus sum of Gaussians approximations.

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