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Finite size scaling in crossover among random matrix ensembles describing interacting lattice systems SUBROTO MUKERJEE, RANJAN MODAK, Indian Institute of Science — We study the crossover among different random matrix ensembles [Poissonian, Gaussian Orthogonal Ensemble (GOE), Gaussian Unitary Ensemble (GUE) and Gaussian Symplectic Ensemble (GSE)] realized in different microscopic models of interacting and disordered lattice systems.. We find that the perturbation causing the crossover among the different ensembles scales to zero with system size as a power law with an exponent that depends on the ensembles between which the crossover takes place. This exponent is independent of microscopic details of the perturbation. We also find that the crossover from the Poissonian ensemble to the other three is dominated by the Poissonian to GOE crossover which introduces level repulsion while the crossover from GOE to GUE or GOE to GSE associated with symmetry breaking introduces a subdominant contribution. We also conjecture that the exponent is dependent on whether the system contains interactions among the elementary degrees of freedom or not and is independent of the dimensionality of the system.

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