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Application of Random Matrix Theory to low-energy heavy-ion reactions SHUSAKU YUSA, KOICHI HAGINO, Department of Physics, Tohoku University — Coupled-Channels calculations taking into account collective excitations have been applied to the analysis of heavy-ion sub-barrier fusion as well as quasi-elastic scattering and have provided good descriptions of the experimental data. Recently, however, there arise some experimental data which cannot be accounted for by such a conventional coupled-channels approach. That is, the experimental quasi-elastic barrier distribution for e.g., ^{20}Ne + ^{92}Zr, is much more smeared than a theoretical barrier distribution. One of the possibilities to cure this problem is to take into account single-particle excitations in the coupled-channels calculation. In order to incorporate that kind of excitations, we employ random matrix theory. In this talk, we will present model calculations for penetrability for a one dimensional potential barrier. We will compare the results in the presence of only the collective excitation to those with both collective and single-particle excitations. Effects of single-particle excitations on barrier distributions and Q-value distributions will be also discussed.

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