QUANTUM DYNAMICS OF UNSTABLE STATES*

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The center of interest in nuclear physics is presently shifted to loosely bound nuclei so that the boundary between the structure and reaction physics ceases to be well-defined defined. At this stage one needs to consider the behavior of a many-body quantum system in the regime covering both discrete and continuum states. The internal states of an open system are coupled directly as well as through the continuum. In the limit of strong continuum coupling, new collective phenomena appear, such as the width redistribution, segregation of short-lived ("superradiant") from long-lived ("trapped") states, change of the spectral statistics etc. The interference between resonances as well as interplay between nuclear many-body collectivity and superradiance leading to the so-called "pigmy" resonance is of a particular interest. We elucidate this dynamics in the context of nuclear physics at the border of stability. Other applications, including the possible mechanism for the narrow width of exotic baryons (pentaquarks), are also discussed.

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