Theoretical study of avoided resonance overlapping and trapping effect in predissociation processes.

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The interaction of overlapping resonances and the resulting segregation between trapped and short-lived decay modes are studied in model cases of vibrational and electronic predissociations. Departure from the energy independent effective Hamiltonian formalism is shown to be decisive for a proper description of the migration of the resonance energies and widths when the strength of the external coupling is increased. Three different methods are used in a complementary way for analyzing this behaviour: the energy dependent partitioning method, the complex scaling method and the wavepacket propagation technique. The transition from the diabatic to the adiabatic regime is discussed in the electronic predissociation case.