**Nonperturbative quantum and classical calculations of multiphoton vibrational excitation and dissociation of Morse molecules**[1] K.I. DIMITRIOU[2,3], TH. MERCOURIS[3], V. CONSTANTOUDIS[2,3], Y. KOMNINOS[3], C.A. NICOLAIDES[2,3] — The multiphoton vibrational excitation and dissociation of Morse molecules have been computed nonperturbatively using Hamilton's and Schr$\phi$dinger's time-dependent equations, for a range of laser pulse parameters. The time-dependent Schr$\phi$dinger equation is solved by the state-specific expansion approach [e.g.,1]. For its solution, emphasis has been given on the inclusion of the continuous spectrum, whose contribution to the multiphoton probabilities for resonance excitation to a number of excited discrete states as well as to dissociation has been examined as a function of laser intensity, frequency and pulse duration. An analysis of possible quantal-classical correspondences for this system is being carried out. We note that distinct features exist from previous classical calculations [2]. For example, the dependence on the laser frequency gives rise to an asymmetry around the red-shifted frequency corresponding to the maximum probability. [1] Th. Mercouris, I. D. Petsalakis and C. A. Nicolaides, J. Phys. B **27**, L519 (1994). [2] V. Constantoudis and C. A. Nicolaides, Phys. Rev. E **64**, 562112 (2001).

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