Dynamical Mean-Field Approach to Anharmonic Oscillators under Time-Dependent Perturbations JEAN-FRANCOIS VAN HUELE, MANUEL BERRONDO, Brigham Young University, JOSE RECAMIER, Universidad Nacional Autonoma de Mexico — We consider the effect of a time-dependent perturbation on an anharmonic oscillator. By expressing the anharmonic oscillator in terms of deformed ladder operators, we obtain the energy spectrum of the unperturbed problem in terms of the quanta of the number operator and an anharmonicity parameter. The combined presence of quadratic terms in the unperturbed Hamiltonian and of the time-dependent perturbation does not lead to a closed algebra and an exact solution. Introducing the mean field in the unperturbed term allows us to obtain a closed algebra with a time-dependent frequency in the unperturbed term. Through factorization of the corresponding evolution operator, the dynamical problem is reduced to a self-consistent system of first-order differential equations. We can now examine this system for transition probabilities, expectation values, phase-space trajectories, and criteria for chaotic behavior in the case of a dipole pulse perturbation.

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