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Coherence Effects in Intense Laser Pulse Dissociative Ionization of H 2+ ANDRE D. BANDRAUK[1], SCZEPAN CHELKOWSKI, Universite de Sherbrooke, MOLECULES IN INTENSE LASER FIELDS TEAM — Numerical solutions of the time-dependent Schroedinger equation (TDSE) for non-Born-Oppenheimer H2+(D2+) in 20-100 fs intense laser pulses are presented to interpret structure observed in the Coulomb-Explosion(CE) spectra during dissociative ionization of the above molecules(Staudte-Corkum,NRC) [1].Detailed dissociative ionization and CE simulations with a non Born Oppenheimer code [2] at different wave lengths and intensities allow to establish the mechanism for such structure in the CE spectra as due to interference between coherent one and two photon electronic excitation .Increasing intensity leads to "localization" of the active electron at the peaks of the electric field of the pulse. "Attosecond" electron ionization at these peaks produces structures in the CE spectra from an interfering coherent superposition of nuclear wave packets on different potential surfaces.The dissociative ionization simulations confirm this as a novel nonlinear coherent electron- nuclear interference phenomenon . [1] A Staudte et al, Phys Rev Lett, in press (2207); [2] A D Bandrauk, S Chelkowski, Phys Rev Lett 84, 3562(2000); 87, 273004(2002).

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