

Quantum Dynamics in Tailored Intense Fields

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Fragmentation dynamics of HeH^+ in ultrashort intense laser fields

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The helium hydride molecular ion, HeH^+ , is the simplest heteronuclear polar molecule and serves as a benchmark system for the investigation of multi-electron molecules and molecules with a permanent dipole. We specifically address the question: How does the permanent dipole of HeH^+ affect the fragmentation dynamics in intense ultrashort laser pulses? We study the laser induced laser-induced fragmentation; including non-ionizing dissociation, single ionization and double ionization; of an ion beam of helium hydride and an isotopologue at various wavelengths and intensities. These results are interpreted using reduced dimensionality solutions to the time-dependent Schrödinger equation and with simulations based on Dressed surface hopping.

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