Atoms and molecules in intense laser pulses

Atoms and molecules are ionized and fragmented in intense laser pulses within femtoseconds. What are the mechanisms behind these quantenmechanical processes? How do the external laser field and the internal Coulomb interactions, which are of comparable strength, act together? In modern theoretical concepts and methods it is possible to incorporate both the highly nonlinear coupling with the field and the long-ranged Coulomb interactions on the same footing. This allows to gain insights into the dynamics of complex ionization processes. In the talk results showing the mechanism of correlated emission of more than one electron from an atom and the role of the structure and symmetry of a molecular orbital during ionization will be presented and discussed.