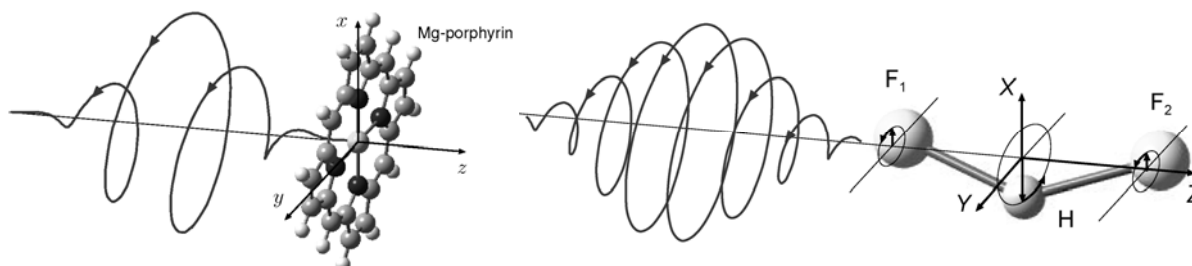


QUANTUM CONTROL BY LASER PULSES: FROM NUCLEAR TO ELECTRON DYNAMICS, AND BACK

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Important concepts of quantum control by laser pulses, e.g. by "pump-dump" type series of laser pulses, by coherent control, or by means of series of π - or $\pi/2$ laser pulses, have been developed during the last two decades, first for control of nuclear dynamics. Typical applications are in the femto-to-pico-second time domain. Recent generations of laser pulses in the femto-to-atto-second time domain suggest extensions to quantum control of electron dynamics. We shall present a brief survey of pioneering progresses in this field of quantum control, before focusing on our contributions to quantum control of electronic and nuclear ring currents and circulations, by means of circularly polarized laser pulses. The ring currents in turn induce magnetic fields. Applications range from pre-oriented medium size organo-metallic molecules via triatomic and diatomic molecules to atoms or atomic ions, see Refs. [1-8]. The corresponding effects which are induced by laser pulse control are much more efficient than traditional generations of ring currents by means of magnetic field.



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