SINGLE MOLECULE LASER INDUCED NUCLEAR FUSION,LINF,IN SUPERINTENSE LASER FIELDS

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Previous work on single molecule quantum dynamics in superintense static electric [1] and laser fields [2-3] has suggested that one can achieve particle (electron,proton,etc) collision energies and currents comparable with large scale accelerators.We show in the present study the importance of Carrier Envelope Phase (CEP) of current and future ultrashort superintense laser pulses in controlling recollisison processes in the muonic molecular systems du-d,du-t,pu-t, and even in proton-antiproton systems,p+p-p+, at intensities up to I=10**23 W/cm2,ie, below the above barrier breakup intensities.Complete quantum dynamic simulations, beyond Born-Oppenheimer,are used to show the importance of the dipole moments of the nonsymmetric systems such as du-t,pu-t,in enhancing particle recollisions with energies sufficient for LINF.This suggests new methods of carrying out LINF by interaction of ultrashort(few cycles) superintense laser pulses with single molecules of elementary particles.

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[3]. N Milosevic,P B Corkum,T Brabec, Phys Rev lett 92,013002(2004).