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Dynamics of dud, dut in superstrong laser fields for laser induced nuclear fusion ANDRE D. BANDRAUK[1], Canada Research Chair, Universite de Sherbrooke, GUENNADDI PARAMONOV, Physics Dept, Rostock University, Germany — Nuclear fusion occurs during the collision of selected isotopes of hydrogen with relative energy in the MeV(10**6 eV) regime. Such high energy ions can be generated by high power lasers applied to clusters [1] via the accumulated ponderomotive energies. However in such schemes laser induced collisions are random whereas as shown previously ultrashort superintense laser pulses can be used to control collisions in muonic molecules [2]. We present full 3-D dynamics from accurate Time-dependent Schroedinger equations, TDSE, s, of the isotopomers, pud, dud, dut in super intense laser pulses with intensities I 10**23 W/cm**2 to illustrate the possibility of inducing always head-on(zero-impact) collisions leading in principle to laser induced nuclear fusion, LINF. Due to its heavy mass(mu/me=185.8) the muonic molecular ions are stable to ionization up to intensities I=10**23 W/cm**2 and recollision of the heavy particles (p,td,t) will be shown to be controllable by few cycle superintense laser pulses leading to LINF.The nonsymmetric isotopomers dut and put manifest enhanced fusion due to the presence of permanent dipole moments.

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[2] S Chelkowski, PB Corkum, AD Bandrauk, Phys Rev Lett 93, 083602(2004)

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