Abstract Submitted
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3-D unrestricted TDHF fusion studies of spherical and deformed nuclei[1] SAIT UMAR, VOLKER OBERACKER, Vanderbilt University — We utilize the Time-Dependent Hartree-Fock (TDHF) method to calculate heavy-ion fusion cross sections for stable and neutron-rich nuclei. The calculations involve modern Skyrme forces, including all time-odd terms in the energy density functional, and are carried out on a large 3-D Cartesian lattice using the Basis-Spline collocation method. One of the appealing features of TDHF is that one can follow the time-evolution of the nuclear density distributions, resulting in either fusion or deep-inelastic reactions. We have studied both stable and neutron rich systems, such as the spherical systems $^{16}O +^{16} O$ and $^{16}O +^{28} O$ [Ref.1], and the spherical plus deformed system $^{16}O +^{22} Ne$ [Ref.2]. Within the framework of density-constrained TDHF [Ref.3], we have found a method to deduce the corresponding heavy-ion interaction potentials for these systems. Most recently, the TDHF code has been implemented on a massively parallel supercomputer; first results for the neutron-rich system $^{132}Sn +^{64} Ni$ will be presented. 1. A.S. Umar and V.E. Oberacker, Phys. Rev. C73, 054607 (2006) 2. A.S. Umar and V.E. Oberacker, nucl-th/0604010 3. A.S. Umar and V.E. Oberacker, nucl-th/0605084

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