Abstract Submitted
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Density-constrained TDHF calculation of fusion cross sections for neutron-rich nuclei[1] VOLKER OBERACKER, Vanderbilt University, SAIT UMAR — We have developed a new microscopic approach for calculating heavy-ion fusion cross sections. The method is based on the TDHF evolution of the nuclear system coupled with density-constrained Hartree-Fock calculations to obtain the heavy-ion interaction potential. This approach incorporates all of the dynamical entrance channel effects such as neck formation, particle transfer, internal excitations (including giant resonances), and dynamical deformation effects. In particular, we focus on systems involving one or two deformed nuclei (^{64}Ni, $\beta_2 = -0.081$) in which case the dynamical nuclear alignment arising from multiple Coulomb excitation must be taken into account. Fusion cross sections below and above the barrier are calculated using the incoming wave boundary condition (IWBC) method. A recently completed analysis [Ref. 1] of the neutron-rich system ^{64}Ni+^{132}Sn will be presented, and we will also discuss new preliminary results for the ^{64}Ni+^{64}Ni system where experimental data show a hindrance of subbarrier fusion.
Ref. 1: A.S. Umar and V.E. Oberacker, Phys. Rev. C74, 061601(R) (2006) and Phys. Rev. C (2007), in print.

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