TDHF Calculation of $^{238}U+^{232}Th$ at 7.5 MeV/nucleon

Body: To date, all known superheavy elements have been synthesized using heavy-ion fusion reactions and are neutron poor. For the past three decades, multinucleon transfer reactions have been studied as an alternative to producing more neutron rich super heavy elements. To complement the understanding of multinucleon transfer, Time Dependent Hartree Fock (TDHF) was applied to a $^{238}U+^{232}Th$ reaction. This reaction has previously been explored experimentally at Texas A&M University by S. Wuenschel et al. In the present work TDHF was used to evaluate $^{238}U+^{232}Th$ collision at $E_{Lab}$= 7.5 MeV/nucleon. The reaction was explored with prolate deformed nuclei in three distinct orientations: parallel (aligned) and perpendicular (anti-aligned) to the beam axis. Information regarding outgoing angle, mass, and charge in the exit channel and contact time were extracted from the TDHF calculations. The $^{238}U+^{232}Th$ reaction displayed the greatest mass exchange when the reactants had deformation axes aligned and anti-aligned configurations with respect to the beam axis.