

Abstract Submitted
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Microscopic analysis of fusion hindrance in heavy systems

KOUHEI WASHIYAMA, RIKEN Nishina Center — It is well known in fusion reactions of heavy systems that the fusion hindrance occurs where the fusion probability is strongly hindered around the Coulomb barrier energy, compared with lighter systems. Quasi-fission process is considered to be mostly responsible for this hindrance. Recently, we proposed a method to extract nucleus-nucleus potential and one-body energy dissipation from the relative motion of colliding nuclei to nuclear intrinsic excitations in fusion reactions from time-dependent Hartree-Fock calculations [1,2]. In this contribution, we apply the above method to heavy systems, $^{96}\text{Zr}+^{124,132}\text{Sn}$, ^{136}Xe and $^{70}\text{Zn}+^{208}\text{Pb}$, and analyze the property of nucleus-nucleus potential and energy dissipation. We show that the obtained potentials show a disappearance of a barrier and monotonic increase at short relative distances, which are different from lighter systems. We also analyze energy dissipation for heavy systems and show that origins of fusion hindrance come mainly from a dynamical increase in extracted potentials at short distances.

[1] K. Washiyama and D. Lacroix, Phys. Rev. C **78**, 024610 (2008).

[2] K. Washiyama, D. Lacroix, and S. Ayik, Phys. Rev. C **79**, 024609 (2009).

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