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Fission dynamics of superheavy compound nuclei

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The time evolution of superheavy synthesis including fusion and fission dynamics is presented based on time-dependent density functional calculations. Despite some shortcomings of the present method (some of them is actually removed in this research), we have a microscopic and self-consistent treatment for many-body quantum dynamics. In this paper, the fission properties of compound nuclei are investigated using the method explained in Refs. [1,2]. Note that there has not been any microscopic theories treating the time evolution of fission sufficiently [3]. As a result of our investigation, several non-trivial things are found; first, the fission of compound nuclei is reproduced within the time-dependent density functional calculations; second, the required duration time for fission is quantitatively obtained to be less than 10^{-20} sec; third, for the first time, the fissibility (fissility) is defined in a microscopic manner [4]. Finally, the impact of ternary collision events to the formation of superheavy nuclei in both laboratory and the universe is presented [5]. It provides a way to keep the compound nuclei in the superheavy synthesis against fission with the help of rotational stabilization.

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