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Influence of the nuclear dynamical deformation on production cross sections of superheavy nuclei

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The superheavy nuclear production mechanism can be described by fusion reactions with the dinuclear system concept, in which the deformations of the two nuclei are assumed to stay at their ground state with nucleons transferring between them. Actually the two nuclei have to deform due to very strong nuclear and Coulomb interactions between them. These deformations can be analytically described by a Fokker-Planck equation, and by combining them with a master equation that describes the nucleon transfer between nuclei the superheavy nuclear production cross sections can be investigated systematically. The calculated results are in good agreement with available data, and the evaporation residue cross sections for synthesizing the superheavy nuclei $Z = 119$ and 120 are predicted.

Primary authors: Prof. ZHANG, Hongfei (Lanzhou University); Prof. LI, Junqing (Lanzhou University)

Presenter: Prof. ZHANG, Hongfei (Lanzhou University)

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