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Theoretical analysis of mass and angle in the superheavy element region ~the possibility of the Z=120 element for fusion explored from the sticking time~

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The next new superheavy element(SHE) locates the 8th period, is the notable element that provides the view on the existence of the predicted "island of stability (114-protons, 184-neutrons)" in the superheavy element region. In addition, neutron-rich nucleus far from the valley of stability in the nuclear chart are thought to have been produced by the r-process caused by supernova explosions and neutron mergers. The n-rich nucleus is important for understanding the origin of elements existing in the universe and the chemical evolution of the universe. For future SHE and n-rich nucleus synthesis, it is indispensable to propose a new method such as using the nucleon transfer reaction in addition to the conventional heavy ion fusion reaction, and to elucidate the reaction mechanism and the mechanism in the formation process. In this study, we focused on the nucleon transfer reactions. In the nucleon transfer reactions, the projectile nucleus receives nucleons from the target nucleus while rubbing around the target nucleus, increases the mass number, and the projectile-like fragment finally apart from the target-like fragment in the certain angle. At that time, there is a correlation between the number of transfer nucleons and the emission angle, and the characteristic differs depending on the projectile and target nucleus. The correlation between mass and angle of the fission fragment mass can understand the mechanism of fission and fusion process.
In this study, we calculated the mass angle distribution(MAD) using the dynamical model and investigated the correlation between mass and angle. As the result, it was possible to show that the correlation between mass and angle in the superheavy element region is different in the superheavy element region. In addition, we investigated the relationship between the fusion possibility for Z=120 and the sticking time from contact to scission.

Experimental nuclear physics

Theoretical nuclear physics

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