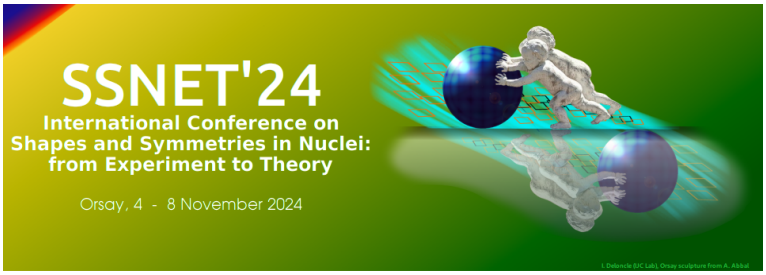

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Alpha knockout and transfer strengths in heavy nuclei

mercredi 6 novembre 2024 15:05 (20 minutes)

Clustering is an intriguing phenomenon in nuclear structure. Correlations between nucleons result in the formation of subunits (cluster) inside the nucleus. The most typical cluster is the alpha particle, which is present not only in light nuclei, but also observed in heavy nuclei as the alpha decay phenomena.

Recently, we have proposed a quantity "local alpha strength function" $S_\alpha(\mathbf{r}, E)$ [PRC 108 (2023) 014318], as a measure of localized four nucleons $(p\uparrow, p\downarrow, n\uparrow, n\downarrow)$. When we remove an alpha particle at the position $\mathbf{r}$ from a nucleus, the final state in the residual nucleus can be expanded in the energy eigenstates. Thus, the local alpha strength function $S_\alpha(\mathbf{r}, E)$ corresponds to the strength to produce the state at energy E in the residual nucleus. Introducing approximations, such as the mean-field with no rearrangement, the calculation becomes feasible.

In this talk, we present several improvements and extensions, such as finite-size effect, alpha reduced width, and applications to transfer reactions.

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