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Alpha cluster structures in nuclei and their related issues in nuclear astrophysics

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Cluster correlation is an important concept in nuclear physics
especially for light nuclei. Alpha cluster structures are expected to emerge near the alpha-decay threshold energies. We are interested in the cluster structures in p- and sd-shell nuclei, and experimentally examine them.
The alpha cluster structures are also deeply related to the nucleosynthesis in the universe because 4He is the second abundant nuclei next to 1H. For example, the triple alpha reaction is one of the most important reactions in the nucleosynthesis. This reaction proceeds via the triple α resonances such as the 0+2, 3-1, and 2+2 states. Therefore, these resonance states should be examined to precisely determine the triple alpha reaction rate. In the present talk, we will present our recent experimental results on the alpha cluster structures and their relevancy to the nuclear astrophysics.

Experimental study on nuclear physics

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