CALCULATIONS ON CLUSTER STRUCTURE OF LIGHT NUCLEI AND ALPHA-DECAY HALF-LIVES OF HEAVY NUCLEI*

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Alpha decay is a powerful way to identify new nuclides and new elements in heavy and superheavy region [1-3]. The different methods to calculate $\alpha$-decay half-lives and branching ratios to various daughter states are discussed. Emphasis is placed on the microscopic models of the coupled channel calculations on $\alpha$-decay half-lives and branching ratios of heavy nuclei [4-10]. Systematic calculations on the half-lives and branching ratios are carried out by the density-dependent cluster model and by multi-channel cluster model and good agreement with available data is reached. This is the systematic calculation on the branching ratios and $\alpha$-decay half-lives of heavy nuclei. It is worth noting that the aim is not only to reproduce the experimental data well, but also to extend our understanding of $\alpha$-decay refined structure. For light nuclei, cluster structure is also a hot pint in nuclear physics [11,12,13] and I will also discuss the cluster structure in light nuclei. Some new results on cluster structure of Be isotopes will be presented.

References

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