

ALPHA-RESONANCES IN MEDIUM AND HEAVY NUCLEI

II. Review of microscopic models

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Abstract

We review microscopic approaches describing α -like resonances in nuclei with $Z \geq 50$. We give a microscopic explanation of α -like rotational bands in the $^{40}\text{Ca}+\alpha$ system in terms of single particle Gamow resonances. On the other hand, we show that for α -decaying nuclei the decay width can be described only in terms of a preformed α -cluster, existing on the nuclear surface in addition to the standard mean field cluster. Thus, we use a semi-microscopic hybrid model combining the mean field formation with a preformed α -cluster in order to explain the order of magnitude of the experimental decay width. Finally, we analyze proton-neutron versus α -like correlations.

keywords: alpha decay, resonant state, decay width

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