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Resonances of He isotopes using complex scaling method

TAKAYUKI MYO, Osaka Institute of Technology, RYOSUKE ANDO, KIYOSHI KATO, Hokkaido University — We investigate the properties of resonances of He isotopes, in particular, ${}^6\text{He}$, ${}^7\text{He}$ and ${}^8\text{He}$. We describe the He isotopes with the cluster model of ${}^4\text{He}+n+n+n+n$. The many-body resonances (for example, five-body resonances of ${}^8\text{He}$) and non-resonant states are described within the correct boundary condition using the complex scaling method. We discuss and predict the energy spectra and decay widths of resonances of He isotopes. We also investigate the characteristics of the structures of each resonances. such as the spectroscopic factors, configuration mixing. In ${}^7\text{He}$, we derive the spectroscopic factors of ${}^6\text{He}+n$ component of the obtained resonances, and also evaluate the corresponding strength functions of one-neutron removal reaction into ${}^6\text{He}$. It is found that the ${}^6\text{He}(2^+)$ resonance gives the dominant contribution in the strength. Non-resonant contributions of ${}^5\text{He}+n$ and ${}^4\text{He}+n+n$ are very small.

Takayuki Myo
Osaka Institute of Technology

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