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Pygmy resonances and radiative nucleon captures for stellar nucleosynthesis

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The significance of low-energy multipole excitations and pygmy resonances for the nucleosynthesis is investigated. For this purpose, a microscopic theoretical approach based on self-consistent density functional theory and QRPA formalism extended with multi-phonon degrees of freedom, is implemented in studies of radiative neutron and proton capture processes in medium and heavy nuclei of astrophysical importance.
The advantage of the method is the fully microscopic nuclear structure input for unified description of low-energy multi-phonon excitations, pygmy and giant resonances. Calculations of radiative capture cross sections of (n,\gamma) and (p,\gamma) reactions in N=50 isotones and Pt isotopes are discussed in comparison with the experiment. For the reactions ^{89}Zr(n,γ)^{90}Zr and ^{91}Mo(n,γ)^{92}Mo theoretical predictions are made.

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