Abstract Submitted
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Statistical properties of nuclei in the static-path plus random-phase approximation[1] PAUL FANTO, YORAM ALHASSID, Yale University — Nuclear level densities and γ-ray strength functions (γSFs) are important inputs to the Hauser-Feshbach theory of compound-nucleus reactions. To calculate these statistical properties, we apply the static-path plus random-phase approximation (SPA+RPA), which includes large-amplitude static fluctuations and small-amplitude quantal fluctuations beyond the mean field. We find excellent agreement between SPA+RPA state densities and exact state densities calculated with the shell model Monte Carlo (SMMC) method in lanthanide nuclei [1]. We also discuss a computational method to extend SPA+RPA calculations to larger model spaces. In addition, we benchmark finite-temperature SPA+RPA $E2$ and $M1$ γSFs by comparing them with exact configuration-interaction (CI) shell model and quasiparticle random-phase approximation (QRPA) γSFs in *sd* shell nuclei. We find that the SPA+RPA reproduces qualitative aspects of the exact CI shell model results. We discuss the current limitations of the SPA+RPA for γSFs and outline possible extensions of this method. [1] P. Fanto and Y. Alhassid, arXiv:2008.13722.

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