

Abstract Submitted  
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**A Performant Algorithm to Calculate Spin- and Parity-Dependent Nuclear Level Densities**<sup>1</sup> ROMAN SENKOV, MIHAI HOROI, Department of Physics, Central Michigan University, Mount Pleasant, MI 48859 — A new algorithm for calculating the spin- and parity-dependent shell model nuclear level densities using the moments method in the proton-neutron formalism will be presented. A new, parallelized code based on this algorithm was developed and tested using up to 4,000 cores on FRANKLIN/NERSC, for a set of nuclei from the *sd*-, *pf*-, and *pf + g9/2*- model spaces. By comparing the low excitation energy nuclear level densities for a given nucleus calculated in two model spaces, such as *pf* and *pf + g9/2*, we could estimated its ground state energy in the larger model space, which is not accessible to direct shell model calculations because of the unmanageable dimension. Examples for the ground state energies of for <sup>64</sup>Ge and <sup>68</sup>Se in the *pf + g9/2* model space will be presented.

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