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Back-Shifted Fermi Gas Model and Nuclear Level Density JIAFENG CHEN, ROMAN SENKOV, La Guardia Comm Coll — Nuclear level density (NLD) represents an important ingredient for the theory of nuclear reactions. In most of the cases relevant to nuclear astrophysics, where experimental information is not available, the reaction rates for medium and heavy nuclei can only be estimated using the Hauser-Feshbach approach, which requires the knowledge of NLDs. In this research, we use NLDs calculated within the Shell Model approach and compare them with the standard phenomenological approaches, such as Fermi-Gas and Back-Shifted Fermi-Gas models. The more specific goal of this research is to fit the parameters of these phenomenological approaches, such as temperature parameter, and to study their behavior across the nuclei in *sd*-shell model space. We also studied the effect of pairing correlations on level density. We found that the pairing gap parameter, which is usually introduced to take into account the odd-even effect, does not cause much impact on the value of the temperature parameters.

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