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# Large-scale shell model calculations of the magnetic dipole strength in 116Sn and 120Sn

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The γ-strength function (γSF) describes the average probability of having a multipole transition that emits or absorbs a γ of energy Eγ . At the lowest γ energies, a low-energy enhancement has been observed in several nuclei, but the research conducted on this area is still scarce. The low-energy enhancement may impact astrophysical neutron-capture reaction rates, which can help us understand why the distribution of heavy elements
is like it is today. Experimental results support that the the enhancement is of dipole character, but whether it is electric or magnetic remains inconclusive. I have conducted large-scale shell model calculations of 116Sn and 120Sn in order to investigate the M 1 contribution to the low-energy enhancement. It is the open-access shell model code KSHELL [1] and the supercomputer Betzy that has been used to perform the calculations. The resulting γSFs and nuclear level density functions have been compared to experimental data obtained by M. Markova [3], where the data for 116Sn is not yet published. These results will be presented and discussed. Several additional tests have been conducted in order to explain the discrepancies seen in the experimental and numerical data. This includes the possible contribution from E2 and the effective interactions and other parameters used in the calculations.

**References**

[1] M. Markova et al. Nuclear level densities and -ray strength functions in 120,124Sn isotopes: Impact of Porter-Thomas fluctuations. Phys. Rev. C, 106: 034322, September 2022

[3] Shimizu N, Mizusaki T, Utsuno Y and Tsunoda Y. Thick-restart block Lanczos method for large-scale shell-model calculations. Computer Physics Communications 2019; 244:372–84. doi: https://doi.org/10.101/j.cpc.2019.06.011

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