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Testing the generalized Brink-Axel hypothesis in heavy nuclei

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Quasicontinuum gamma decay following compound reactions - commonly called Oslo method - is probably the most important source of information on the gamma strength functions and level densities of nuclei below particle threshold. A fundamental assumption in the analysis of Oslo-type data (and in fact all astrophysical reaction network calculations) is the generalized Brink-Axel (BA) hypothesis, whose applicability to the low-energy regime is under debate (see [1] and references therein). Since all other methods are based on the measurement of photoabsorption from the ground state, a test of the equivalence of results from absorption and emission experiments in the same nuclei postulated by the BA hypothesis is most important. I will discuss inelastic proton scattering experiments performed at RCNP in extreme forward kinematics, where relativistic Coulomb excitation dominates the cross sections [2]. Such data provide information on the E1 [3] and M1 [4] parts of the GSF and their sum can be directly compared to the compound-nucleus decay experiments. Furthermore, their very good energy resolution permits the extraction of level densities [5-7] and thereby an independent test of the normalization methods applied in the analysis of Oslo-type data.

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- [2] P. von Neumann-Cosel and A. Tamii, Eur. Phys. J. A 55, 110 (2019)
- [3] S. Bassauer et al., Phys. Rev. C 102, 034327 (2020)
- [4] S. Bassauer, P. von Neumann-Cosel and A. Tamii, Phys. Rev. C 94, 054313 (2016)
- [5] I. Poltoratska et al., Phys. Rev. C 89, 054322 (2014)
- [6] D. Martin et al., Phys. Rev. Lett. 119, 182503 (2107)
- [7] M. Markova et al., Phys. Rev. C 106, 034322 (2022)

Attendance Type

In-person

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