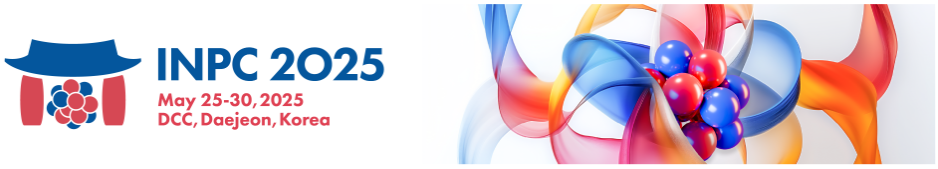

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Search for gamma decay of near-threshold states in light nuclei

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We present recent results on the γ decay of peculiar near-threshold states in ^{11}B and ^{14}C [1,2], located in the continuum just above the proton- and neutron-decay threshold, respectively. Near-threshold states play a major role to understand the onset of collectivization and clusterization phenomena, as well as the coupling between bound and scattering states, and they have impacts on the abundance of elements in the Universe. These resonances can be described by the Shell Model Embedded in the Continuum (SMEC), which points to the appearance of near-threshold states in light nuclei as a universal phenomenon [3]. In this context, we have performed two experiments, at LNL with the GALILEO-TRACE and at ANL with the GRETINA-ORRUBA setups, using fusion-evaporation reactions to populate near-threshold resonances in ^{11}B and ^{14}C, respectively. For these nuclei, SMEC calculations predict γ-ray branches of the order of 10^{-3} and 10^{-5}, respectively and, for the first time, limits were established in the present experiments. Implications for the description of ^{11}B and ^{14}C as open quantum systems will be discussed and future perspectives will be presented.

[1] S. Bottoni et al, Phys. Lett. B 855, 138851 (2024)
[2] G. Corbari et al, in preparation
[3] J. Okołowicz, et al. Phys. Rev. Lett. 124, 042502 (2020)

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