

## In-beam $\gamma$ -ray spectroscopy of $^{32}\text{Mg}$

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In the so-called “island of inversion,” the ground states of neutron-rich nuclei around  $N = 20$  exhibit strong admixtures of intruder configurations, which lead to the breakdown of the  $N = 20$  shell gap. At the heart of the island of inversion is  $^{32}\text{Mg}$ , and from both experimental and theoretical perspectives, this nucleus serves as a critical benchmark.

In this contribution, we report on a precision in-beam  $\gamma$ -ray measurement of  $^{32}\text{Mg}$  using two direct-reaction probes, one-neutron (two-proton) removal from  $^{33}\text{Mg}$  ( $^{34}\text{Si}$ ). By combining observables obtained in this measurement, a significantly updated level scheme for  $^{32}\text{Mg}$  was constructed, and various structures coexisting in this key nucleus were unraveled. The experimental results were compared with predictions by state-of-the-art theoretical models. However, unexplained discrepancies remain, meaning that the structure of  $^{32}\text{Mg}$  is not yet fully understood.

### Experimental study on nuclear physics

Yes

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