

Coulomb excitation of neutron-rich $^{29,30}\text{Na}$ nuclei with MINIBALL at REX-ISOLDE: Mapping the borders of the island of inversion

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For the $^{28,29,30}\text{Na}$ isotopes a gradual transition from the usual filling of the neutron levels into the region with low lying 2p-2h cross shell configurations, the so-called island of inversion, is described by theory [1,2]. Detailed theoretical predictions for the transition strength are awaiting experimental verification in all three Na nuclei. Collective properties of excited states of $^{29,30}\text{Na}$ were subject of a recent Coulomb excitation experiment at REX-ISOLDE employing radioactive $^{29,30}\text{Na}$ beams with a final energy of 2.85 MeV/u. De-excitation γ -rays were detected by the MINIBALL γ -spectrometer in coincidence with scattered particles in a CD-shaped segmented Si-detector. The recently determined $B(E2)$ value [3] for the $5/2^+$ level in ^{29}Na at 72 keV could be confirmed. A preliminary $B(E2) \approx 350(65) e^2\text{fm}^4$ value for the $2^+ \rightarrow 3^+$ transition in ^{30}Na is of similar strength like the $0^+ \rightarrow 2^+$ transition strength in the neighboring ^{32}Mg . The new data show clearly an increase in collectivity for the neutron rich Na case, indicating a deformed intruder dominated ground state configuration.

[1] T. Otsuka *et al.*, Phys. Rev. Lett. **87**, 082502 (2001)

[2] Y. Utsuno *et al.*, Phys. Rev. C **70**, 044307 (2004)

[3] A.M. Hurst *et al.*, Phys. Lett. B **674**, 168-171 (2009)

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