

BAND Science Highlight Lightweight self-conjugate nucleus ⁸⁰Zr

This work provides evidence for the existence of a deformed double shell closure in ⁸⁰Zr through high precision Penning trap mass measurements of ⁸⁰⁻⁸³Zr. The new mass values show that ⁸⁰Zr is significantly lighter (by ~370 keV), and thus more strongly bound than anticipated. A statistical Bayesian model mixing analysis employing several global nuclear mass models was used to interpret the observed mass anomaly. According to theory, the observed effect can be attributed to the deformed shell closure at N=Z=40 and the large Wigner energy.

- Publication: Nat. Phys. 17, 1408 (2021)
- News and Views article emphasizing the BMA aspect: <u>Nat. Phys. 17, 1283 (2021)</u>
- Covered by <u>14 news outlets</u>



Figure: The effect of the anomalous mass of ⁸⁰Zr on the mass indicator δV_{pn} : a significant decrease from the baseline in the N=Z+2 sequence, and a slight rise in the N=Z sequence, which mirrors the behavior of other doubly-magic nuclei ⁵⁶Ni and ¹⁰⁰Sn. The thick teal line is the Bayesian Model Averaging result based on several nuclear models. The light band represents the uncertainty of the statistical approach.