

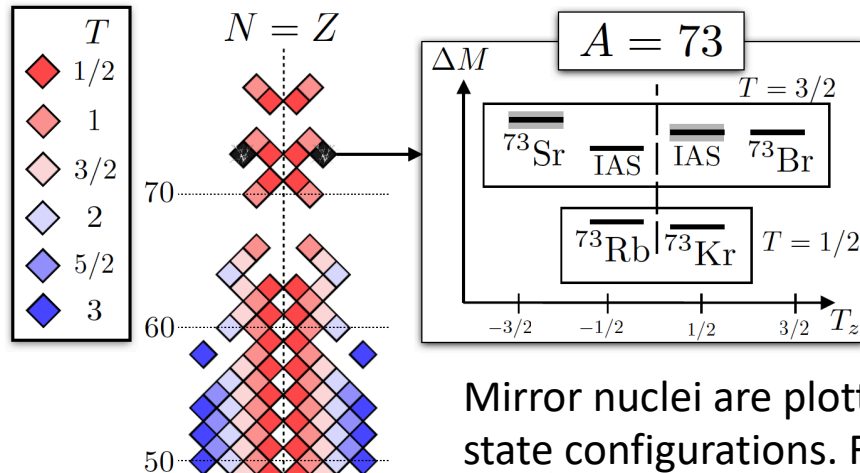
# Discovery of mirror symmetry violation in bound nuclear ground states

## Objectives

- The experiment demonstrated the first breakdown of mirror symmetry between the ground states of particle-bound nuclei,  $^{73}\text{Sr}$  and  $^{73}\text{Br}$ .
- Theoretical explanation was done with the Gamow coupled-channel approach, which provides the correct outgoing asymptotic behavior to describe the decay of proton unbound resonance in  $^{73}\text{Rb}$ .

## Impact

- The calculation demonstrates the importance of the coupling to the continuum for states beyond the drip lines and the role that near-threshold resonant states with zero angular momentum can play in constructing the many-body wave functions.
- The Gamow coupled-channel approach developed under NUCLEI has demonstrated its usefulness when applied to unbound nuclear states.



## Accomplishments

- Publication: Hoff et al., [Nature 580, 52 \(2020\)](#)
- Highlighted in Nature's [News & Views](#)
- Featured in [Phys.org](#).

Mirror nuclei are plotted according to the isobaric-spin ( $T$ ) of their ground-state configurations. For almost the entire mirror chart, the spin and parity of the ground states of mirror partners are identically reflected across the  $N = Z$  line. The black squares for  $A=73$  nuclei show the only two places on the mirror chart where this ground-state mirror symmetry is known or believed to be broken.