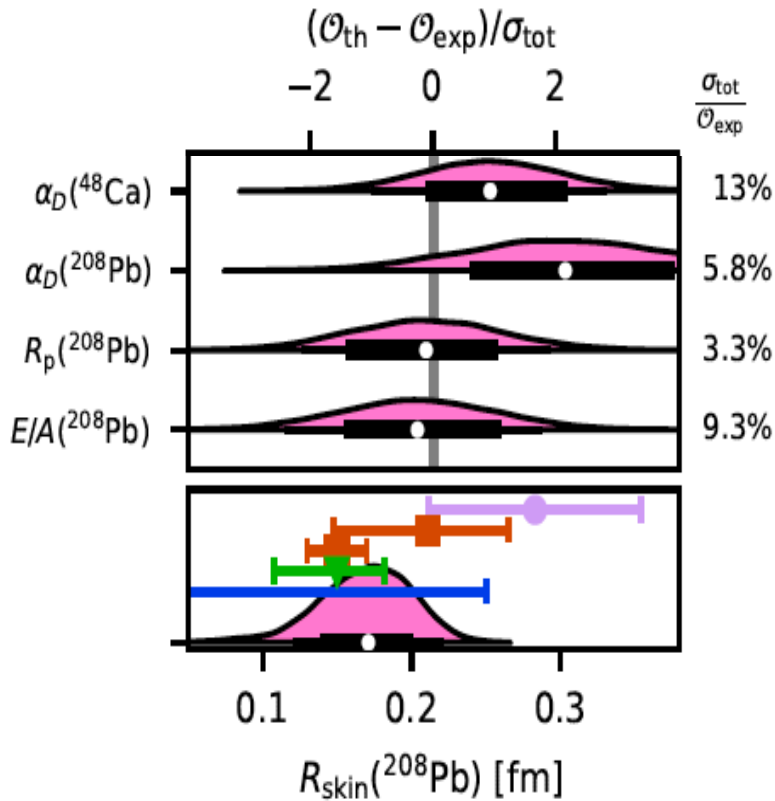




# Ab initio computation of the neutron skin in $^{208}\text{Pb}$



## Objectives

- First principles computation of the difference between the radii of neutron and proton distributions in  $^{208}\text{Pb}$

## Impact

- Confront recent extraction of neutron skin from parity-violating electron scattering at CEBAF with state-of-the-art theory
- Sample more than 100 million parameterizations of nuclear forces to find non-implausible set
- Quantify theoretical errors
- Ab initio computation of heavy nucleus  $^{208}\text{Pb}$

## Accomplishments

- Theory predicts a neutron skin that is in mild tension with less precise extraction from CEBAF experiment
- Publication: Baishan Hu et al., arXiv:2112.01125

Top: Predictions of the dipole polarizability ( $\alpha_D$ ) in  $^{48}\text{Ca}$  and  $^{208}\text{Pb}$ , the point-proton radius ( $R_p$ ), and the binding energy per nucleon ( $E/A$ ) in  $^{208}\text{Pb}$  shown as probability distributions.

Bottom: Predicted probability distribution of neutron skin ( $R_{\text{skin}}$ ) in  $^{208}\text{Pb}$  compared to various extractions from experiments (CEBAF in purple)