



A2 Neutron Skin Measurements via Coherent Pion Photoproduction

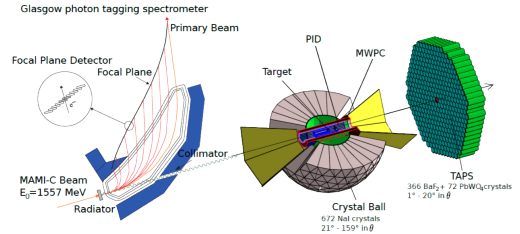
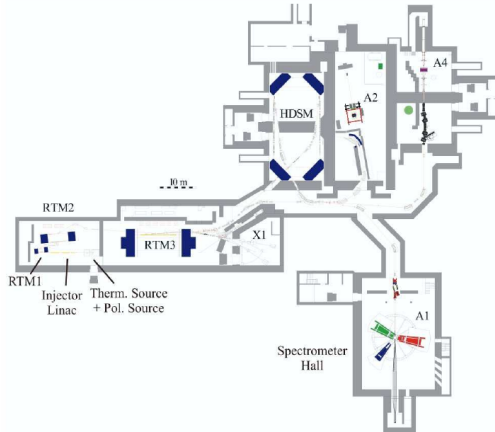


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July 1st, 2026



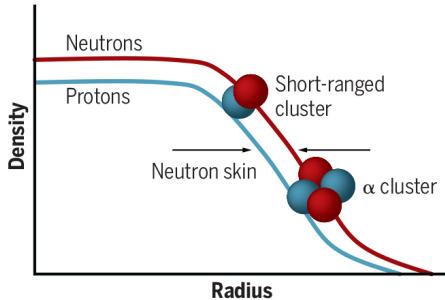


MAMI and A2





Nucleon density in neutron-rich nuclei

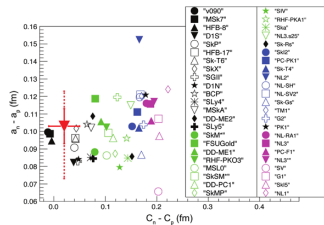
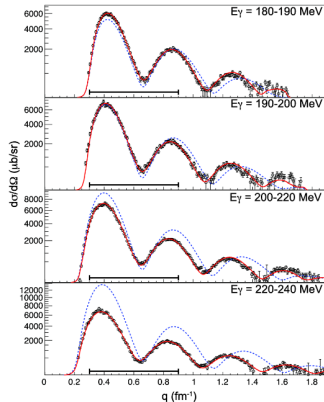


Science, 371, 6526 (2021)

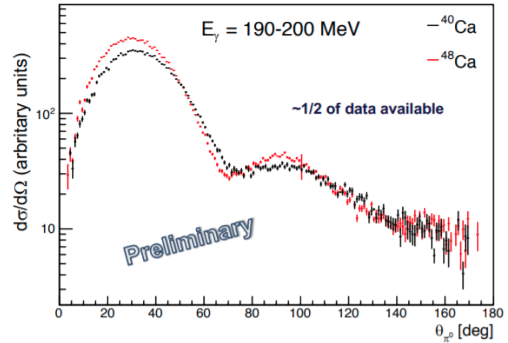
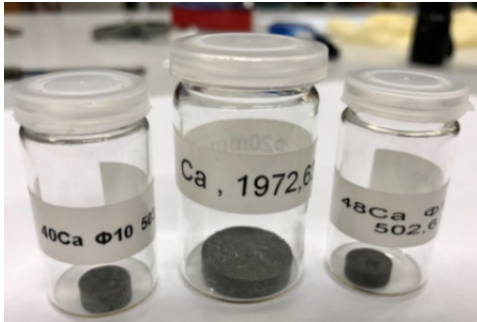
- Proton distribution radius measurable with electromagnetic probes
- Neutron counterpart is more difficult
- Neutron skin thickness, Δr_{np} , is a key parameter with impact on a diverse range of topics in nuclear physics
- Precision measurements needed to constrain models



- A2 study of Lead-208, published in 2014
- Closed proton ($Z=82$) and neutron ($N=126$) shells means relatively well understood structure
- Neutron skin measured via coherent pion photoproduction
- Precision measurement discriminating between models



PRL 112, 242502 (2014)



Dedicated measurements on two Calcium isotopes; ^{40}Ca and ^{48}Ca
Coherent π^0 and $2\pi^0$ production

- Neutron skin measurements via coherent pion photoproduction a prime example of UK-Mainz collaboration in the A2@MAMI program
- The Lead-208 paper is among the most highly cited works from A2, and motivated additional data-taking
- Calcium data in the can, analysis ongoing
- $2\pi^0$ channel could further probe Neutron Star Equation of State, exploring whether the $d^*(2380)$ dibaryon has any role