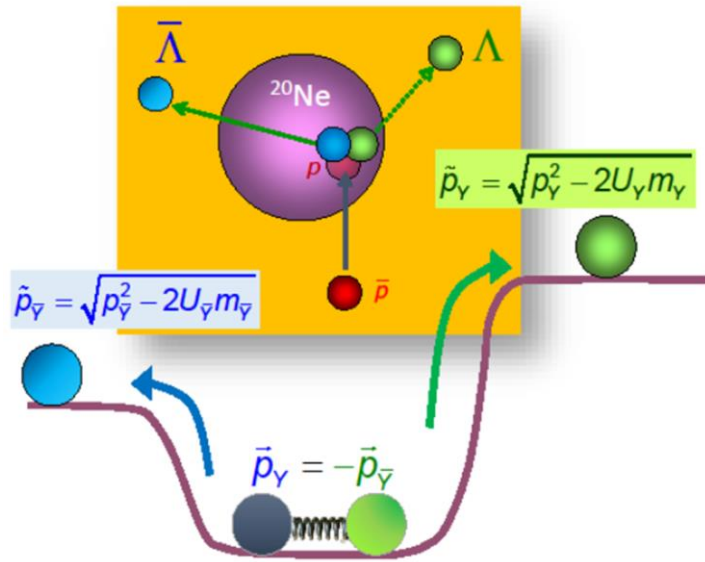


Exploring antihyperons in nuclei at PANDA

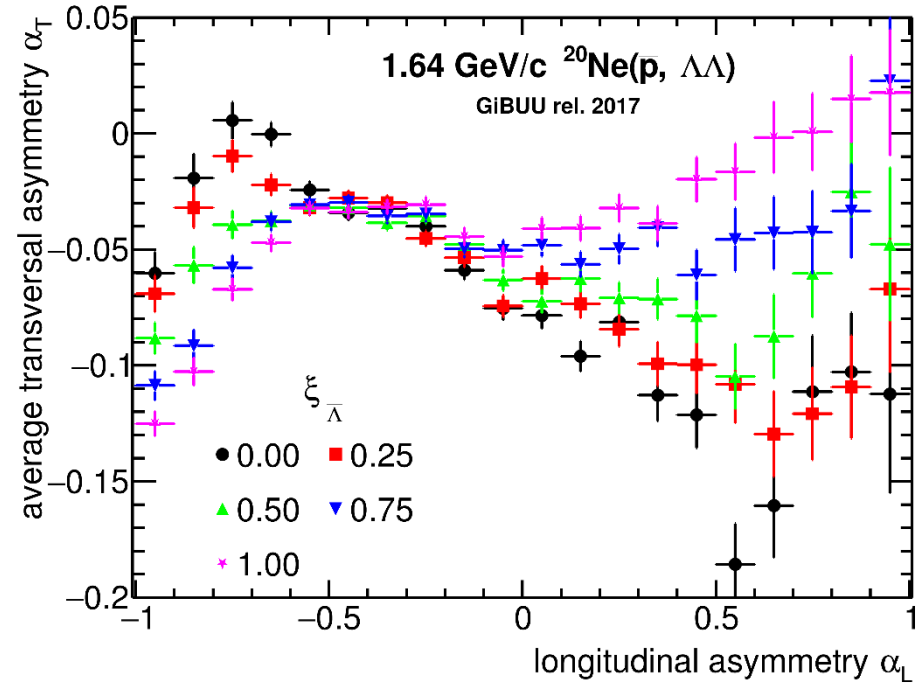
***Falk Schupp¹, Patrick Achenbach^{1,2}, Michael Bölting¹, Josef Pochodzalla^{1,2}, Marcell Steinen¹**

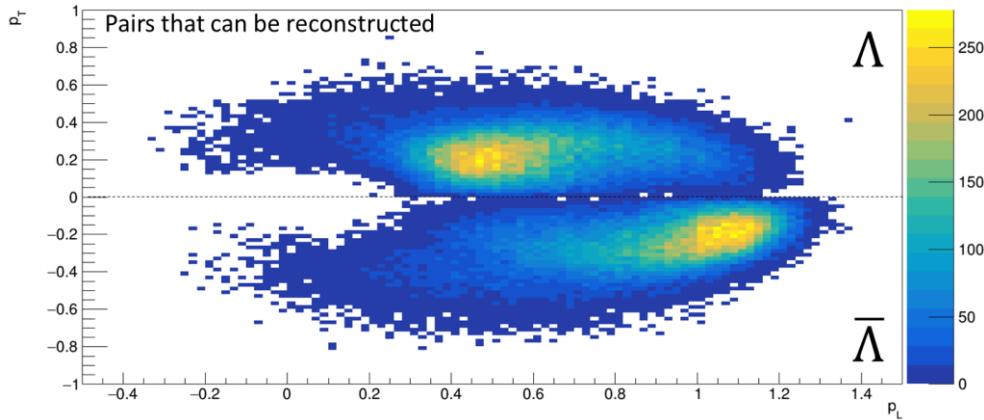
¹Helmholtz-Institut Mainz, Germany;

²Institut für Kernphysik, Johannes Gutenberg-Universität Mainz, Germany;



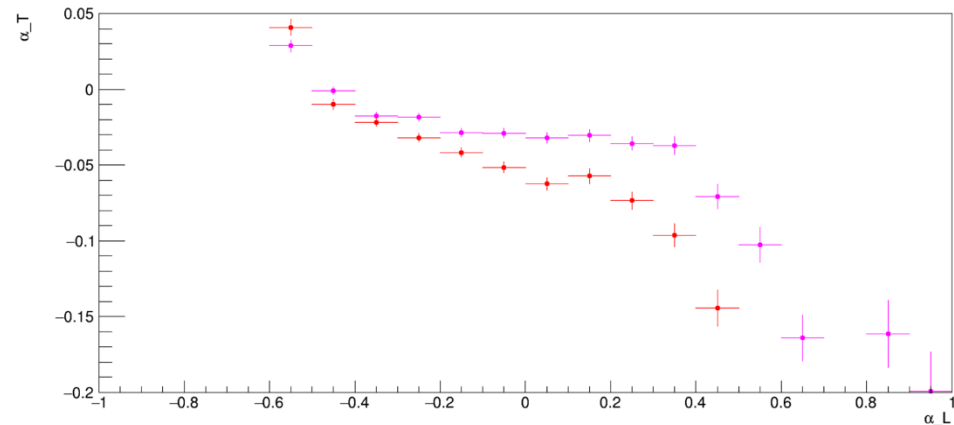
- Study reaction $\bar{p}A \rightarrow \Lambda\bar{\Lambda}$
- Hyperon momenta modified by nuclear potential
- Observe momentum asymmetry





- Simulate events in PANDA using PandaRoot
- Study reconstruction:
 - Momentum resolution
 - Efficiency

- Efficiency varies with asymmetry
- Reconstruction changes observed momentum asymmetry
- **However, asymmetry remains sensitive to potential after reconstruction**

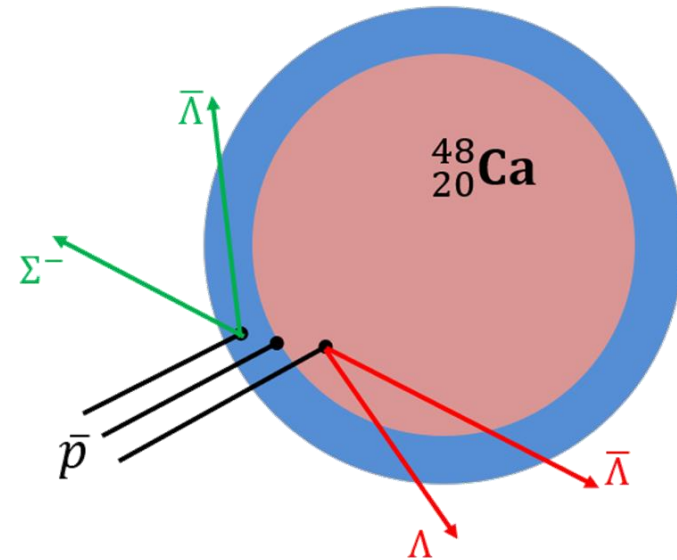
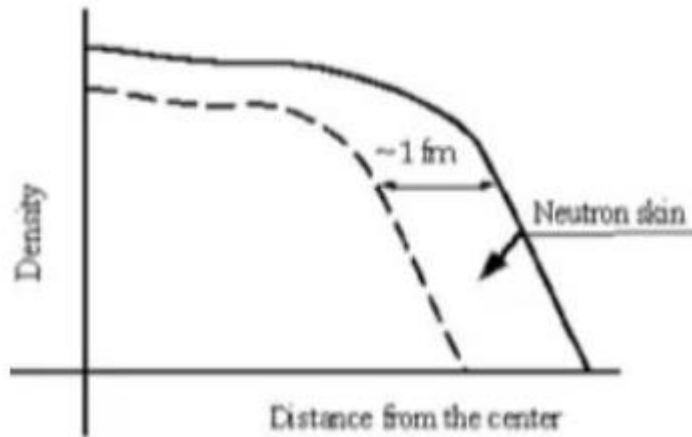


Probing the neutron skin in nuclei by exclusive $\bar{\Lambda}\Lambda$ and $\bar{\Lambda}\Sigma^-$ production with antiprotons

*Martin Christiansen¹, *Falk Schupp¹, Patrick Achenbach^{1,2},
Michael Bölting¹, Josef Pochodzalla^{1,2}, Marcell Steinen¹

¹Helmholtz-Institut Mainz, Germany;

²Institut für Kernphysik, Johannes Gutenberg-Universität Mainz,
Germany;

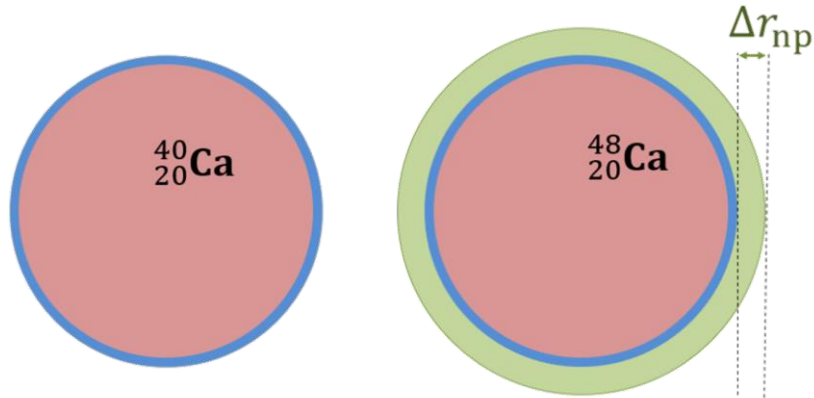


- Measure neutron skin on isotope chains
- Proton distribution well known
- Neutron difficult to measure
- Correlated with symmetry energy
 - Important parameter in nuclear EOS

- New approach using antiprotons
- Use exclusive pair production:



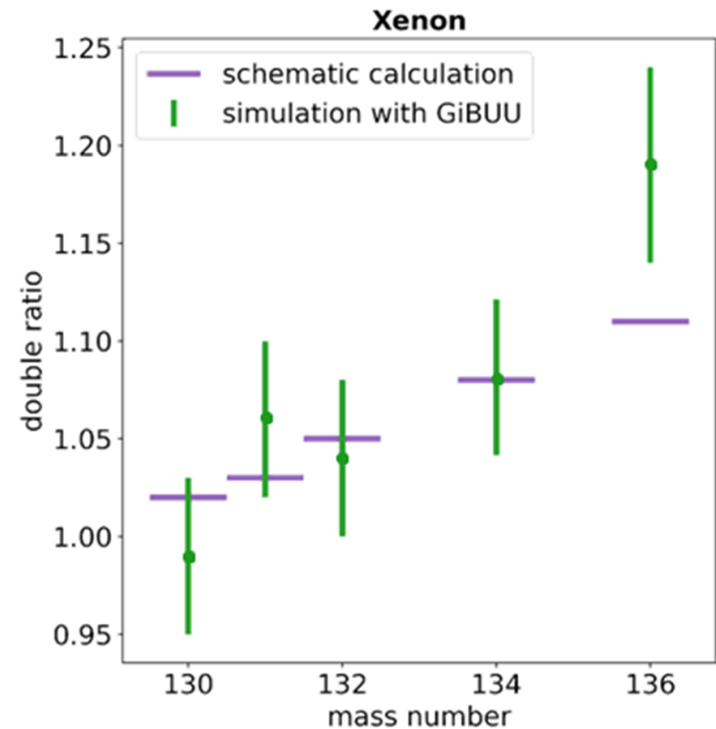
- Strong absorption of antiprotons in neutron skin



- Compare two isotopes:
- Define double ratio:

$$DR = \frac{R_{48\text{Ca}}}{R_{40\text{Ca}}} \sim \sigma_{\bar{p}n} \cdot \rho_n \cdot \Delta r_n$$

- Suppresses systematic effects



- GiBUU simulation of different isotopes
- Calculated double ratios correlate with neutron skin thickness