



Contribution ID: 535

Type: Poster

First Deuteron Production Measurement in Proton-Proton Interactions at SPS energies by NA61/SHINE

Tuesday 5 September 2023 17:30 (2h 10m)

NA61/SHINE has measured the first deuteron production in proton-proton interactions at 158 GeV/c ($\sqrt{s} = 17.3$ GeV). These measurements will be presented and compared to different nuclear formation models. The two most prevalent formation models—the thermal and coalescence models—are based on different underlying physics. A better understanding of (anti)nuclei production mechanisms is needed, which drives the effort to analyze high-statistics data sets from fixed-target experiments. Additionally, new updated measurements of proton, antiproton, π^\pm , and K^\pm spectra will be showcased, along with unique measurements of Omega and K0s production in p+p interactions.

Deuteron production measurements are important for understanding cosmic-ray antinuclei. The detection of cosmic antinuclei holds the potential to be a breakthrough approach for identifying dark matter signatures. The main source of cosmic antinuclei background are interactions between cosmic-ray protons and interstellar hydrogen gas. Gaining a deeper insight into deuteron production in p+p interactions is an essential first step in modelling these astrophysical processes. Furthermore, modeling of light antinuclei production typically requires antiproton production cross sections as input. Precise antiproton measurements are crucial. The updated hadron spectra exhibit significantly reduced statistical uncertainties and extend the phase space coverage in rapidity and transverse momentum compared to earlier measurements. These advancements can be employed to refine our understanding of proton-proton interactions.

Category

Experiment

Collaboration (if applicable)

NA61/SHINE

Author: SHUKLA, Anirvan (University of Hawai'i at Manoa (US))

Presenter: SHUKLA, Anirvan (University of Hawai'i at Manoa (US))

Session Classification: Poster Session

Track Classification: Nuclear astrophysics