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Identified hadron spectra in high-statistics p+p collisions at 158 GeV/c

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The detection of cosmic-ray antinuclei is a potential breakthrough approach for the identification of dark matter. Dominant sources of antinuclei in the astrophysical background are proton-proton interactions. Typically, a process producing heavier antinuclei will also produce antiprotons. Therefore, the antiproton production constrains the other antinuclei when assuming specific parameters for antinuclei formation, and needs to be measured with high precision. The production of light (anti)nuclei (e.g. deuterons) in hadronic interactions is described by different models (coalescence, thermal model etc.), which are also not well understood. A better understanding of these mechanisms is needed, which motivates the effort to analyze large data sets from fixed-target experiments.

The NA61/SPS Heavy Ion and Neutrino Experiment (NA61/SHINE) is a fixed-target experiment at the CERN Super Proton Synchrotron, which studies hadron production in hadron-nucleus and nucleus-nucleus collisions for various physics goals. This talk will present the new preliminary measurements of $\pi\pm$, K±, proton and antiproton spectra using the high-statistics proton-proton data sets from NA61/SHINE. The new spectra cover a larger phase space in rapidity and transverse momentum, and will be compared to previous results from NA61/SHINE, as well as to predictions of current models. Efforts to measure the deuteron production will also be discussed.

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