The 19th International Conference on Strangeness in Quark Matter
May 17-22, 2021, sponsored by Brookhaven National Laboratory, Upton, New York

Contribution ID: **116** Type: **Experimental talk**

Charm and multi-charm baryon measurements via strangeness tracking in the upgraded ALICE detectors

Tuesday 18 May 2021 11:10 (20 minutes)

A fundamental ingredient of the ALICE physics programme for the new decade is a comprehensive study of charm and multi-charm baryon production. Because charm is exclusively produced in initial hard scatterings, such measurements may provide unique insight into the QGP medium as well as hadronization from proton-proton to lead-lead collisions.

We will present a new method for detection of multiply charmed baryons via their decays into strange baryons, using 'strangeness tracking'. In this method, the state-of-the-art upgraded silicon detectors in ALICE during Runs 3, 4 and beyond will enable the novel possibility of tracking strange hadrons directly before they decay, leading to a very significant improvement in impact-parameter resolution. In this work, we will discuss how this new technique will be crucial to distinguish secondary strange baryons originating from charm decays from primary strange baryons. This is a particularly interesting possibility for the Ω^- baryon coming from $\Omega_c^0 \rightarrow \Omega\pi$ decays, since there is no other feeddown source for Ω^-. This, in turn, means that the main Ω^- background for the Ω_c measurement will point most accurately to the primary vertex, unlike pions or protons from other charmed baryon decays.

We will illustrate the achievable performance of strangeness tracking for the Run 3 configuration of ALICE with the upgraded Inner Tracking System, which is fully instrumented with silicon pixel detectors. Moreover, we will discuss the potential of this technique in a future experiment with an extensive silicon tracking detector with a first layer very close to the interaction point. Finally, we will also cover other potential major applications of strangeness tracking, including measurements of hypernuclei such as the $^{3}_{\Lambda}$H.

Collaboration

ALICE

Author: DOBRIGKEIT CHINELLATO, David (University of Campinas UNICAMP (BR))

Presenter: DOBRIGKEIT CHINELLATO, David (University of Campinas UNICAMP (BR))

Session Classification: Upgrades and New Experiments

Track Classification: Open questions and new developments