The 22nd International Conference on
Strangeness in Quark Matter
22-27 March, 2026, Los Angeles, CA

Contribution ID: **123** Type: **Oral Presentation**

Evidence of $\overline{^4\mathrm{Li}}$ signal from $\bar{\mathrm{p}} + \overline{^3\mathrm{He}}$ femtoscopy

Tuesday, 24 March 2026 17:45 (20 minutes)

At the LHC, matter and antimatter are produced in equal abundance, making it a true antimatter factory. Among the many antiparticles observed, antinuclei are of particular interest, as their production mechanism in high-energy hadronic collisions remains a topic of active discussion and fascination. The ALICE Collaboration has previously measured, for the first time, the production of anti-alpha ($\overline{^4\mathrm{He}}$) nuclei in pp and Pb–Pb collisions. However, ^{4}He isnot the only known A = 4 nucleus: the unstable ^{4}Li nucleus has also been observed in a few experiments and is experimentally accessible by ALICE. In this talk, the first evidence of the antimatter counterpart of ^{4}Li, the anti-^{4}Li nucleus ($\overline{^4\mathrm{Li}}$), is presented. The particle is reconstructed via its two-body decay channel $\overline{^4\mathrm{Li}} \rightarrow \overline{^3\mathrm{He}}$+p, using both invariant-mass analysis and femtoscopic correlations.
A dedicated analysis procedure has been developed to subtract the correlated and uncorrelated $\overline{^3\mathrm{He}} - \bar{\mathrm{p}}$ combinatorial background. The production yield of $\overline{^4\mathrm{Li}}$ is compared with that of $\overline{^4\mathrm{He}}$. Owing to its resonance nature and its spin degeneracy, the production of $\overline{^4\mathrm{Li}}$ is expected to be enhanced relative to the compact $\overline{^4\mathrm{He}}$, making this new measurement a sensitive probe for testing nucleosynthesis models in high-energy hadronic collisions.

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Session Classification: Parallel I: Strangeness and HF