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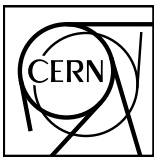

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Measurement of the lifetime and Λ separation energy of ${}^{3}_{\Lambda}\mathrm{H}$

Supplemental material

ALICE Collaboration*

Abstract

The most precise measurements to date of the ${}^{3}_{\Lambda}\mathrm{H}$ lifetime τ and Λ separation energy B_{Λ} are obtained using the data sample of Pb–Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV collected by ALICE at the LHC. The ${}^{3}_{\Lambda}\mathrm{H}$ is reconstructed via its charged two-body mesonic decay channel (${}^{3}_{\Lambda}\mathrm{H} \rightarrow {}^{3}\mathrm{He} + \pi^{-}$ and the charge-conjugate process). The measured values $\tau = [253 \pm 11\ (\mathrm{stat.}) \pm 6\ (\mathrm{syst.})]$ ps and $\mathrm{B}_{\Lambda} = [102 \pm 63\ (\mathrm{stat.}) \pm 67\ (\mathrm{syst.})]$ keV are compatible with predictions from effective field theories and confirm that the ${}^{3}_{\Lambda}\mathrm{H}$ structure is consistent with a weakly-bound system.

*See Appendix A for the list of collaboration members

1 Additional Figures

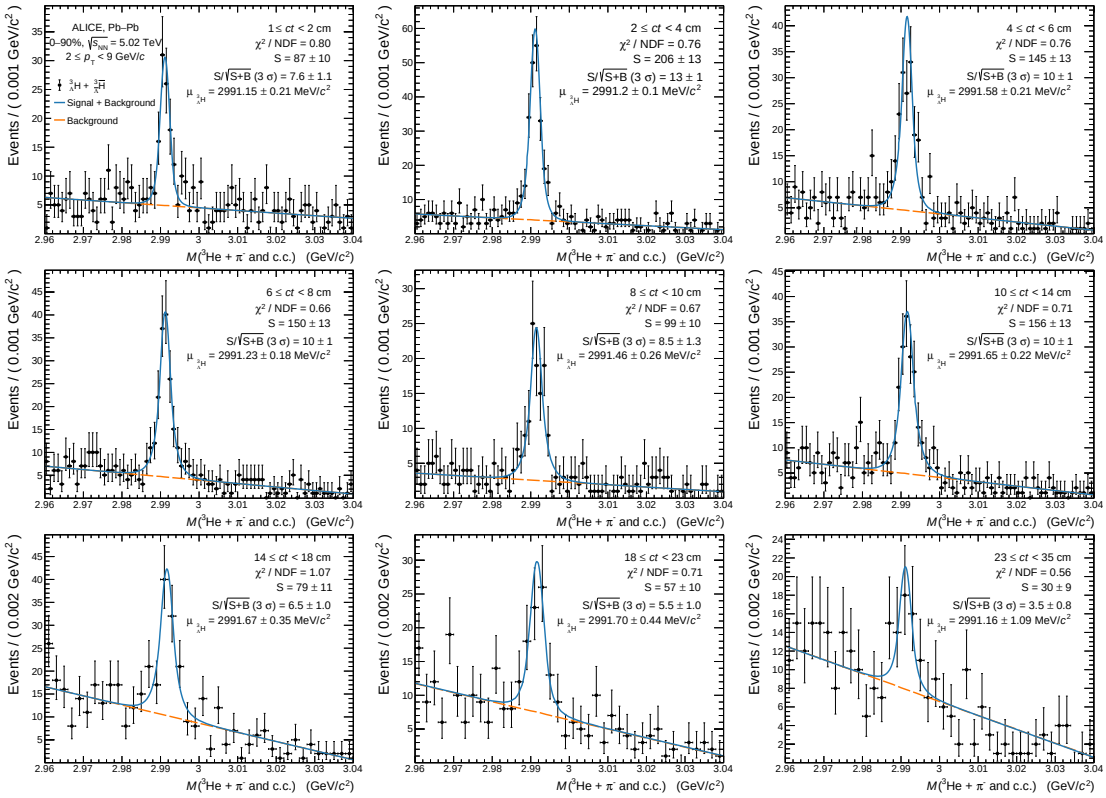

Figure 1: Distribution of the invariant mass of the $^{3}_{\Lambda}$H and $^{3}_{\Lambda}\overline{\text{H}}$ candidates in nine *ct* intervals from 1 to 35 cm. The statistical uncertainties of the bin counts are represented with vertical lines. The distribution is fitted with a two-component model; the blue line depicts the overall fit, and the orange dashed line displays the background component.

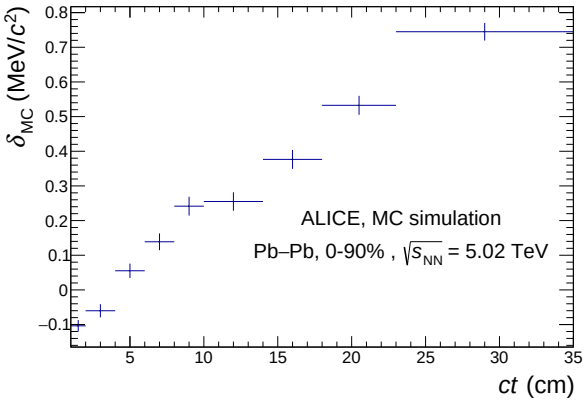

Figure 2: Reconstruction shift δ_{MC} observed in the MC as a function of the proper decay length. The statistical uncertainties are represented with vertical lines. The value of δ_{MC} increases with the distance travelled by the $^{3}_{\Lambda}$H candidates before decaying.

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A The ALICE Collaboration

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