Hypertriton production in large and small systems with ALICE

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"deuteron" core

- ${}^{3}_{\Lambda}$ H: lightest known hypernucleus bound state of a neutron, a proton and a Λ
 - two body halo nucleus: ${}^{3}_{\Lambda}$ H approximated as a bound state of a deuteron and a Λ with an expected radius of ~ 10 fm⁻¹
- \circ Unique probe for understanding the A-nucleus interaction, with strong implications for astro-nuclear physics
 - hyperons are expected to be produced in the inner core of neutron stars

• We can identify the hypertriton daughter particles (³He and π^{-}) profiting from the excellent particle identification (PID) of ALICE



Lifetime and B_{Λ} measurements in Pb—Pb collisions

- Signal extracted with a fit to the invariant mass spectrum of the selected candidates
- 9 ct bins from 1 to 35 cm



• Analysed data samples:

- \circ lifetime close to the free Λ one
- $\circ B_{\Lambda}$ compatible with zero

• ultimate proof of the weakly bound nature of ³ H²



First measurement of ³ H production in pp and p—Pb collisions



Hildenbrand F. et al., Phys. Rev. C, 100(3), 034002 (2019) ² S Pérez-Obiol A., Physics Letters B, vol. 811 (2020)

³ Vovchenko, et al., Phys. Lett., B785, 171-174, (2018) ⁴ Sun. et al., Phys. Lett. B, 792, 132–137, (2019)