$K^{*\pm}$ production in Pb-Pb collisions at LHC

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Outline:

- ✔ **Motivation**
- ✔ **Signal extraction**
- ✔ **Results**
- ✔ **Summary**

Motivation

✔ **Resonances:** Short lived particles which decay via strong interaction

Lifetime (fm/c)

ρ^0 (1.3) < K* (4.16) < Σ* (5.0) < Λ* (12.6) < φ (46.2)

✔ **Hadronic phase:** Phase between chemical and kinetic freeze-out

Resonances are a good tool to probe rescattering vs regeneration effect in the hadronic phase

The measurement of the $K^{*\pm}$ resonance production is presented

Properties of $K^{*\pm}$

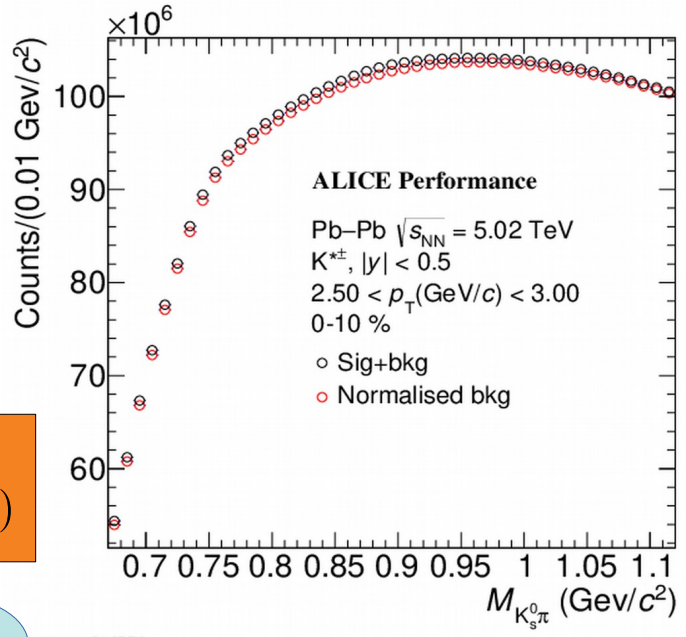
Mass (GeV/c^2)	0.891
Width (GeV/c^2)	0.050
Spin	1
Quark content	$u\bar{s}$
Decay mode	$K^0_s\pi$
B.R (%)	33.3

Signal extraction

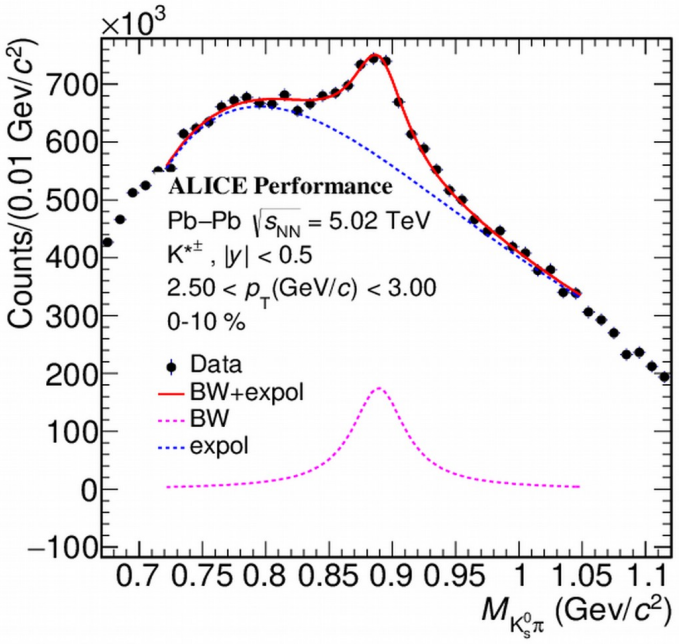
Dataset

Collision system	Pb-Pb
$\sqrt{s_{NN}}$	5.02 TeV
Events	120 M

Before bkg subtraction

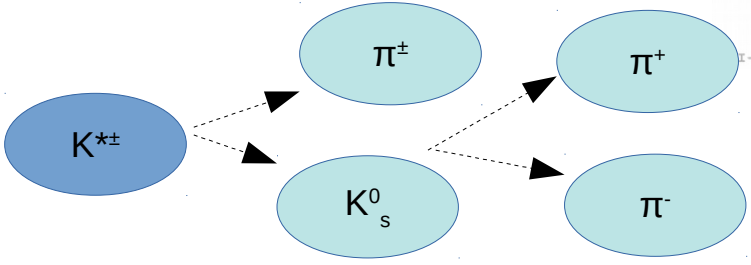


After bkg subtraction



✔ **Invariant mass method:**

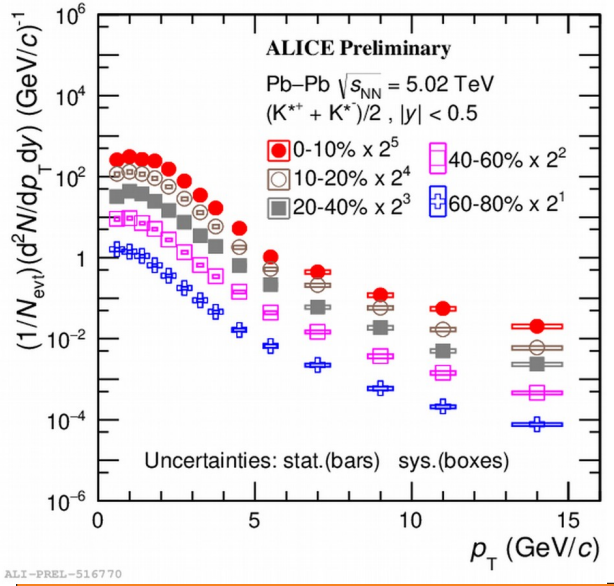
$$M_{K^0_s\pi} = \sqrt{((E_1+E_2)^2 - (\vec{p}_1+\vec{p}_2)^2)}$$



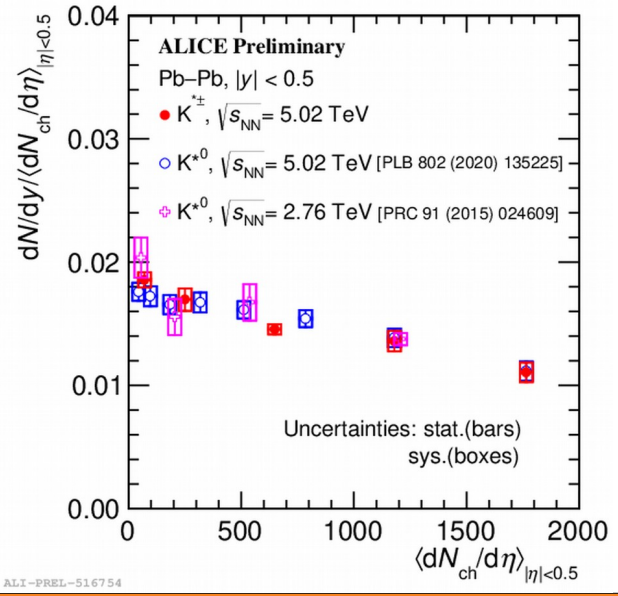
✔ **Combinatorial bkg:** Mixed Event
✔ **Fit function:**
- Signal: Breit-wigner
- Residual background: Exponential+quadratic

Results

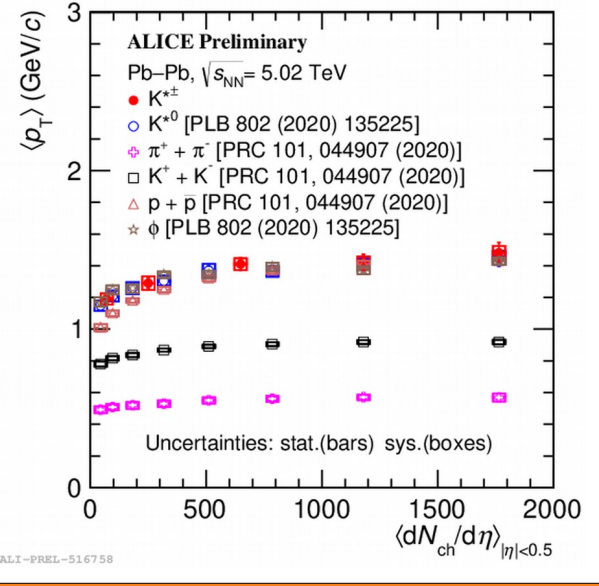
Transverse momentum spectra



Normalized yield

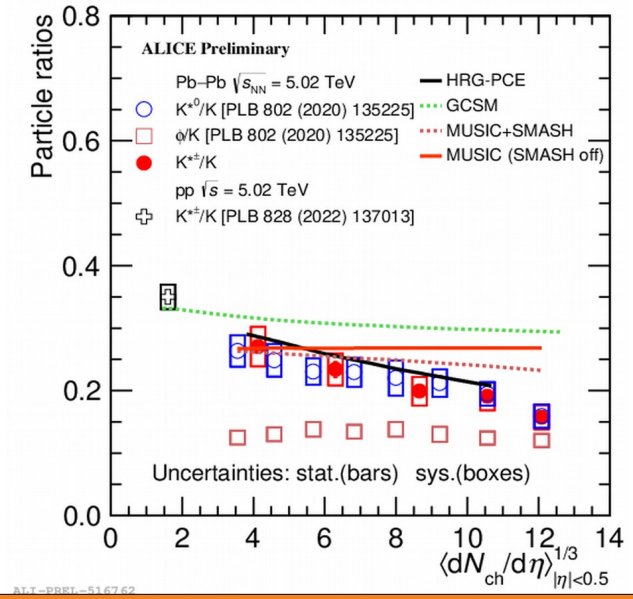


Mean transverse momentum



- ✔ Inverse slope of p_T spectra increases with increasing multiplicity
- ✔ dN/dy, $\langle p_T \rangle$ of $K^{*\pm}$ is consistent with K^{*0} within uncertainties
- ✔ $K^{*\pm}$ yield at 5.02 TeV and K^{*0} yield at 2.76 TeV are similar at similar dN_{ch}/dη
- ✔ $\langle p_T \rangle$ increases with multiplicity and mass of hadrons
- ✔ Mass ordering in $\langle p_T \rangle$ is obeyed in central collisions but breaks down in peripheral collisions

Results



- ✔ K*/K yield yield ratio decreases with increasing system size, in contrast to φ/K yield ratio which remains constant
- ✔ Rescattering dominates over regeneration
- ✔ Models with rescaterring effect (MUSIC+SMASH and HRG-PCE) qualitatively describe the data

Summary

- ✔ First measurement of $K^{*\pm}$ is presented in Pb-Pb collisions at 5.02 TeV
- ✔ d*N*/d*y* of $K^{*\pm}$ depends on event multiplicity
- ✔ In central collisions $\langle p_T \rangle$ follows mass ordering
- ✔ Particle ratios study shows evidence of rescattering effect similarly like K^{*0}