Production of π, K, p in high-multiplicity pp collisions at $\sqrt{s}$ =13 TeV with ALICE

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on behalf of the ALICE Collaboration

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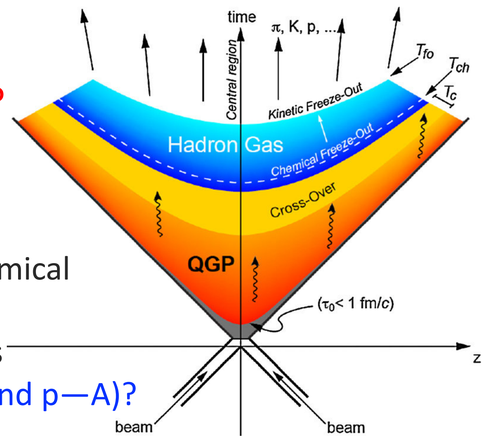
1. Motivation

- *Quark-gluon plasma* (QGP) a hot and dense medium in which quarks and gluons are deconfined. QGP formation at LHC energy in AA collisions has been confirmed.

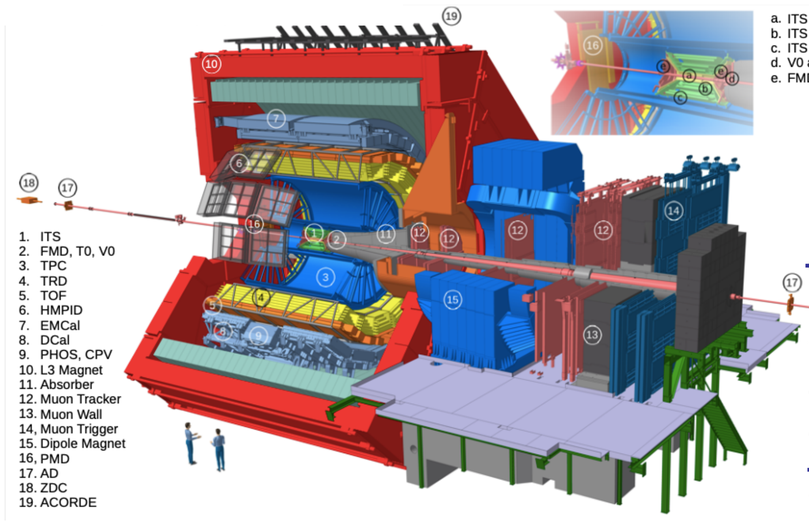
QGP formation in small system? High multiplicity (HM) pp collisions events can answer this better

Why studying light-flavour hadrons (π, K, p)?

- Constitute the bulk of particle production
- Hardening of the p_T spectra -> similar to radial flow, chemical freezeout temperature
- Particle yield ratios -> hadron chemistry, chemical temperature
- Useful to compare different collision systems ->collectivity like effect in small system (pp and p—A)?



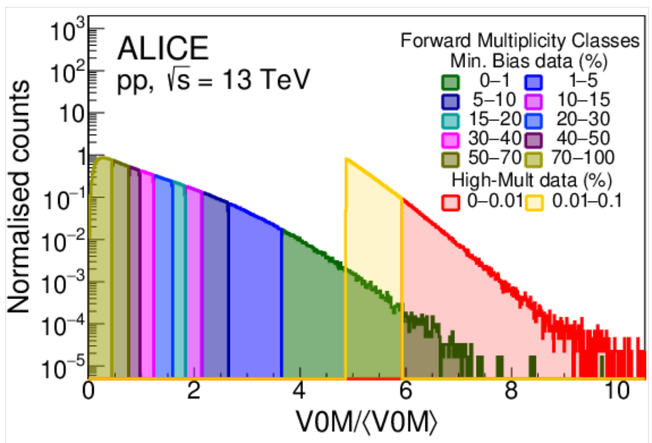
2. ALICE detector system in Run 2



ITS ($|\eta| < 0.9$)
- Six layers of silicon detector
- Vertexing, tracking, PID

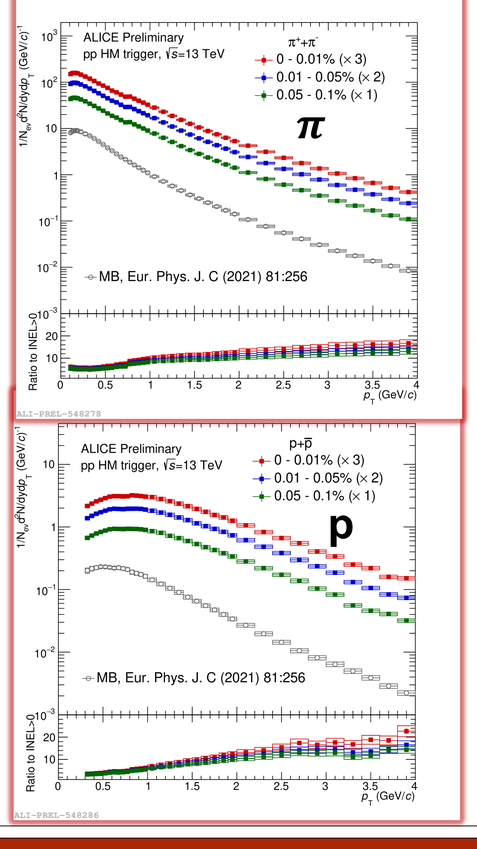
TPC ($|\eta| < 0.9$)
- MWPC readout
- Tracking and PID (dE/dx)

TOF ($|\eta| < 0.9$)
- Fast timing by MRPC
- PID, resolution (σ_t) 56 ps



V0: V0C ($-3.7 < |\eta| < -1.7$) + V0A ($2.8 < |\eta| < 5.1$)
- Arrays of scintillators at forward rapidity
- Triggering
- Background suppression
- Event-class determination (multiplicity)

3. π, K, p spectra at pp collisions at $\sqrt{s}$ = 13 TeV



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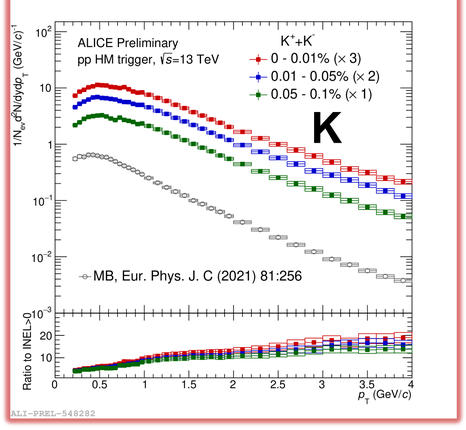
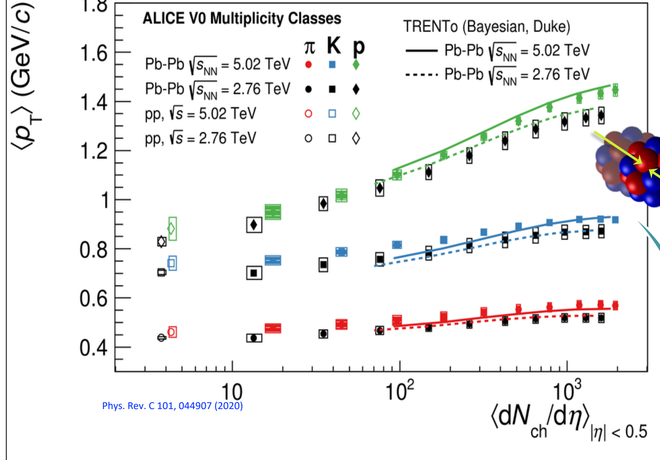


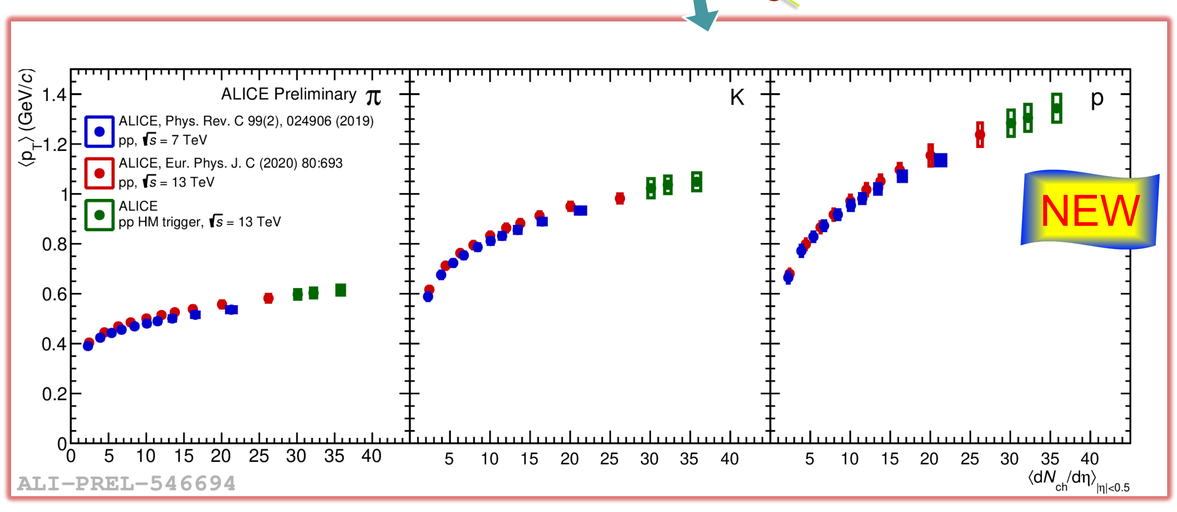
High multiplicity results

- ✓ At low p_T mass-dependent hardening of the spectra is observed in small system.
- ✓ Similar to ***radial flow*** in AA collisions.

4. <p_T> vs multiplicity



- Multiplicity dependent ⟨p_T⟩
- Increase is steeper with increasing mass -> Radial flow like



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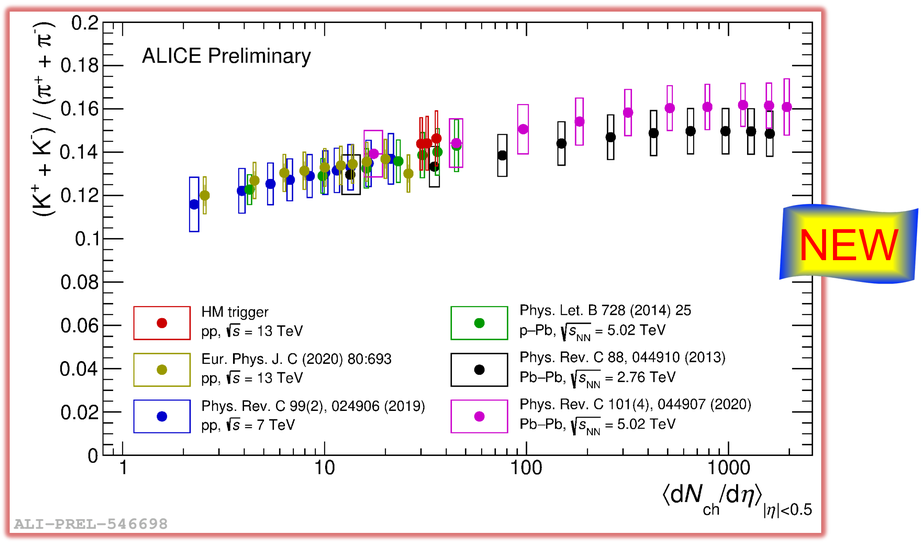
5. Ratio of integrated yields: Hadrochemistry



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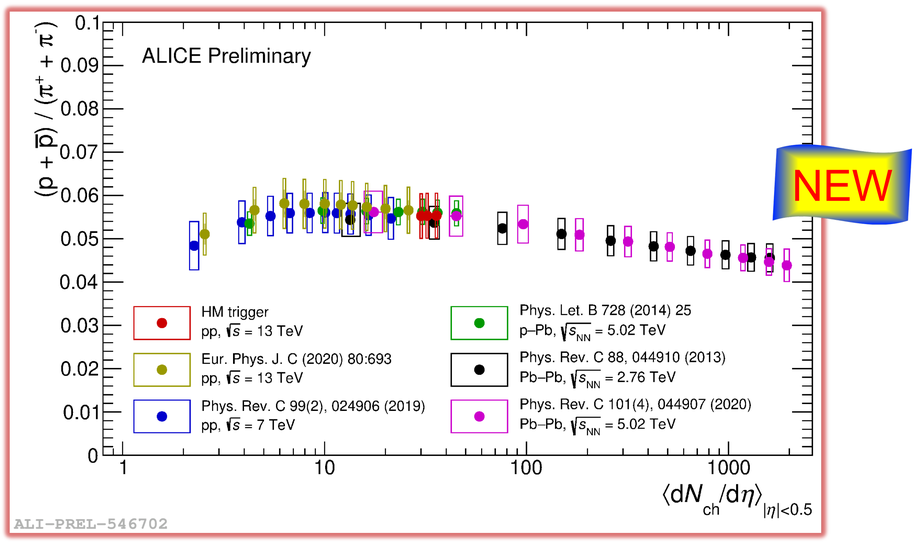

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- High multiplicity results follow the smooth transition from pp to Pb–Pb collisions
  - ✓ Universal scaling of hadrochemistry with charged-particle multiplicity [1]
- increasing trend of the K/π ratio → Strangeness enhancement [2]
- Decreasing trend in the p/π ratio → Antibaryon-baryon annihilation [2]

5. References

[1] Eur. Phys. J. C (2020) 80:693

[2] Phys. Rev. C 101, 044907 (2020)