Flash talk

Current status and future prospects of measuring hadronic interactions in pp collisions at 13.6 TeV with ALICE

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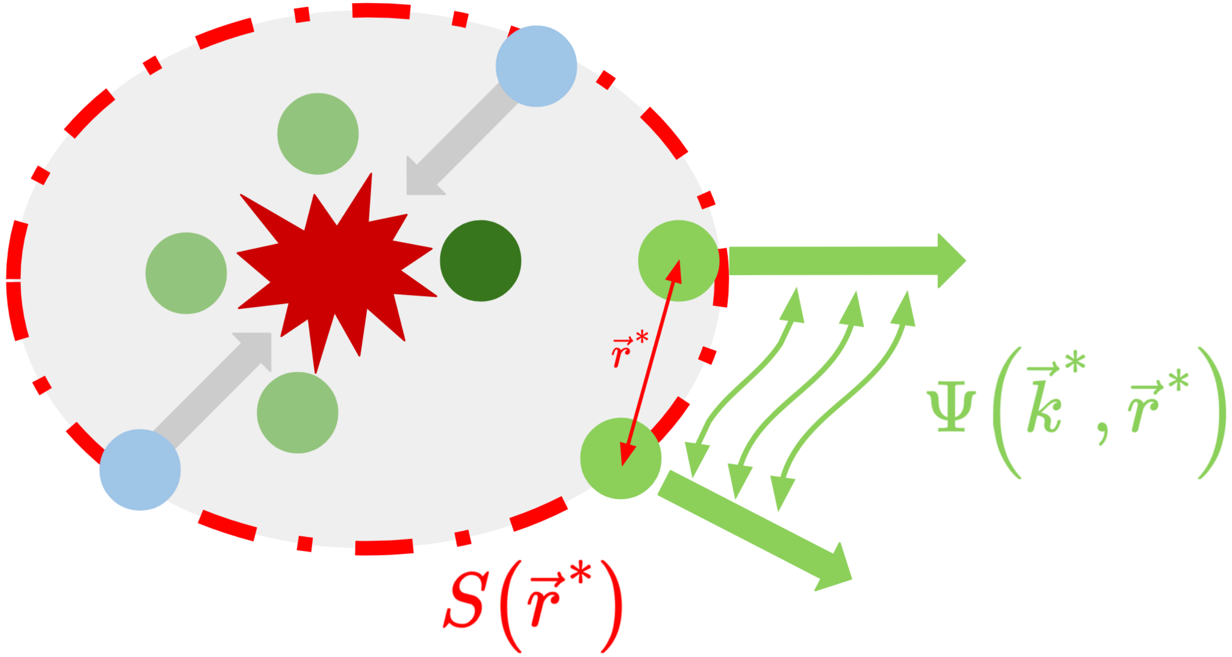
23rd Zimányi school
Winter Workshop on Heavy Ion Physics
December 4-8, 2023
Budapest, Hungary

Accessing hadronic interactions with femtoscopy

$$C(k^*) = \mathcal{N}\frac{N_{SE}(k^*)}{N_{ME}(k^*)} = \int S(r^*)\left|\Psi(k^*, r^*)\right|^2 \mathrm{d}^3 r^*$$



Workflow for fixing the source:

- Measure correlation function C(k*)
- Fix interaction Ψ(k*)
- Study source S(r*)

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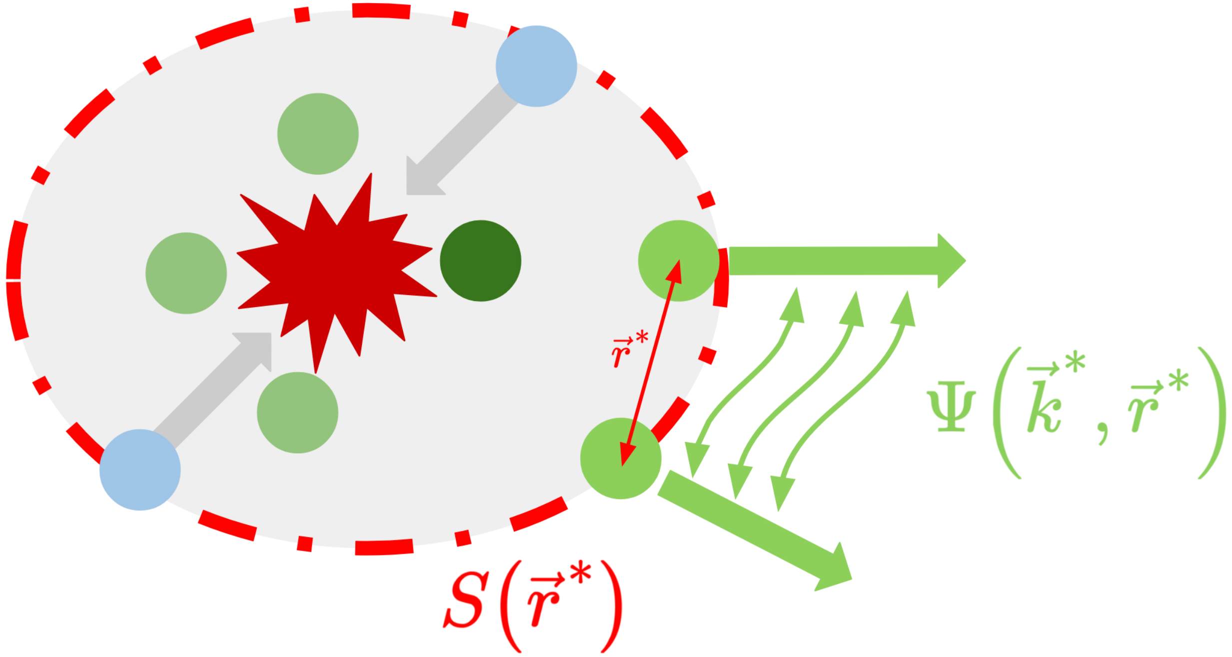

Workflow for accessing interaction:

- Measure correlation function C(k*)
- Fix source S(r*)
- Study interaction Ψ(k*)

⇒ Accessing exotic interactions, e.g.:
p–Ω and Λ–Ξ (multi-strange)
p–D^+ (charmed)

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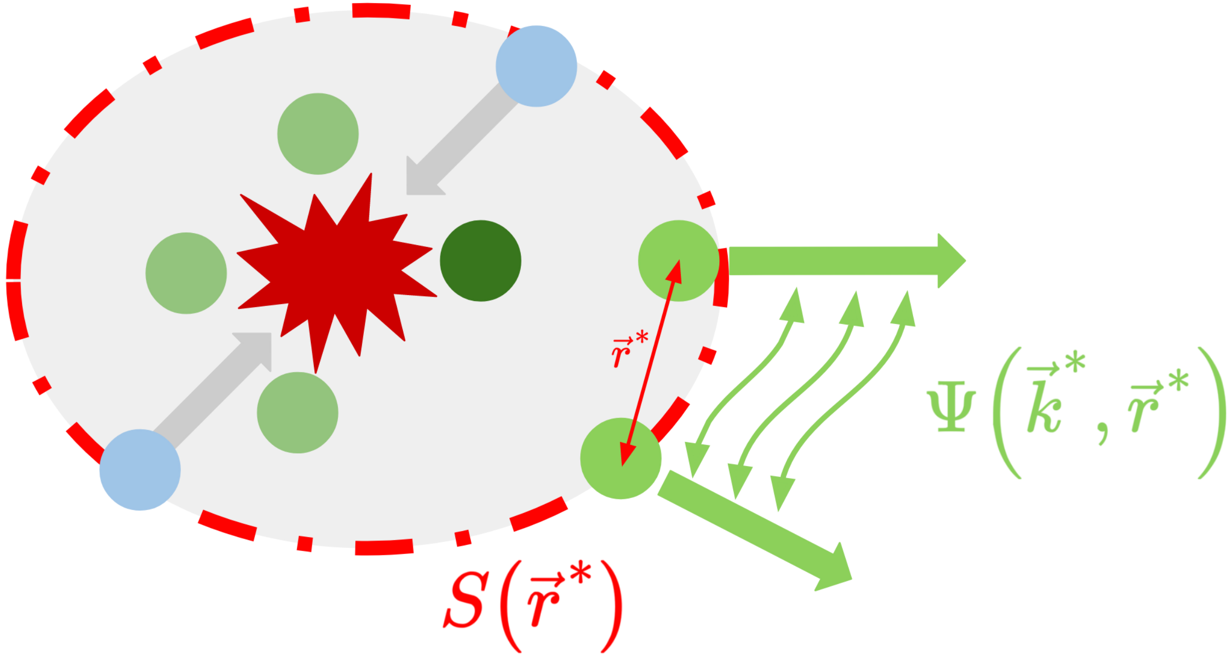
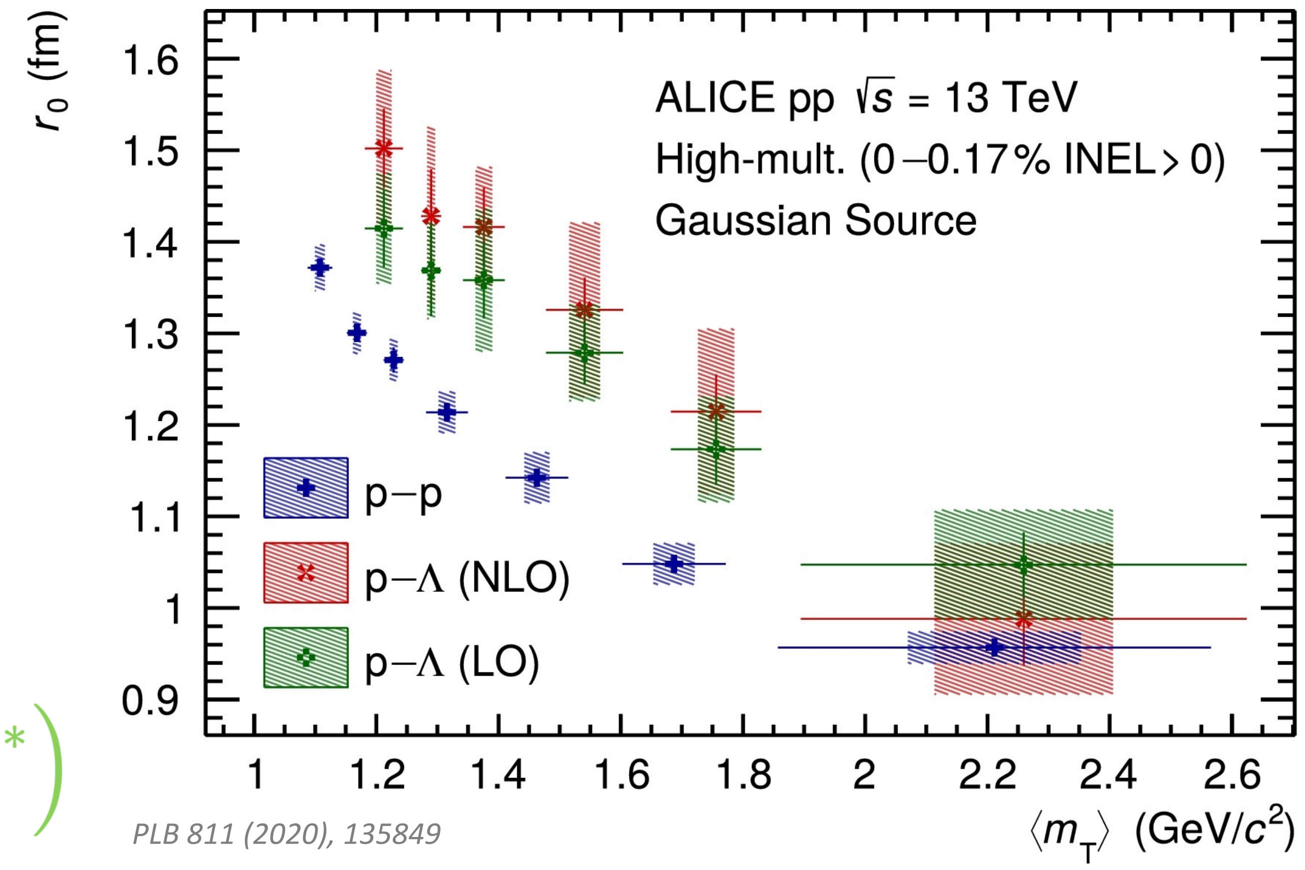
Common baryonic source in pp collisions

How to constrain the source size:

- Measure **correlation function C(k*)**
- Fix **interactions Ψ(k*)** -> **p–p & p–Λ**
- Take **short-lived resonances** into account
- Extract **source as a function of m_T**





PLB 811 (2020), 135849

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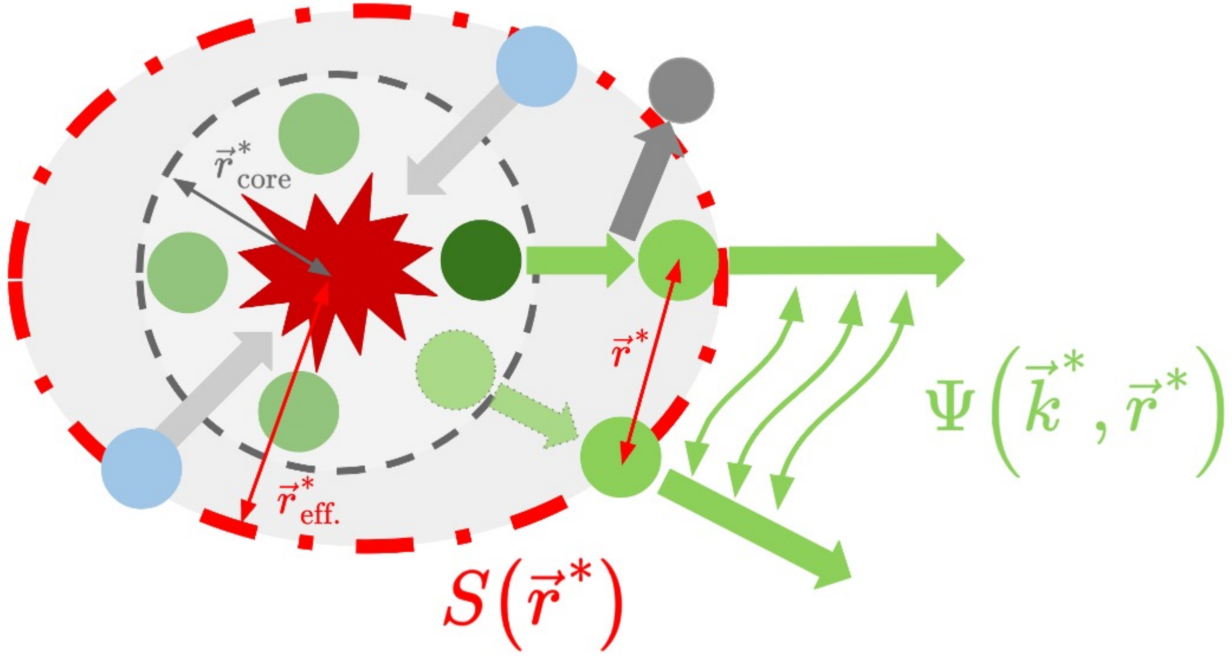

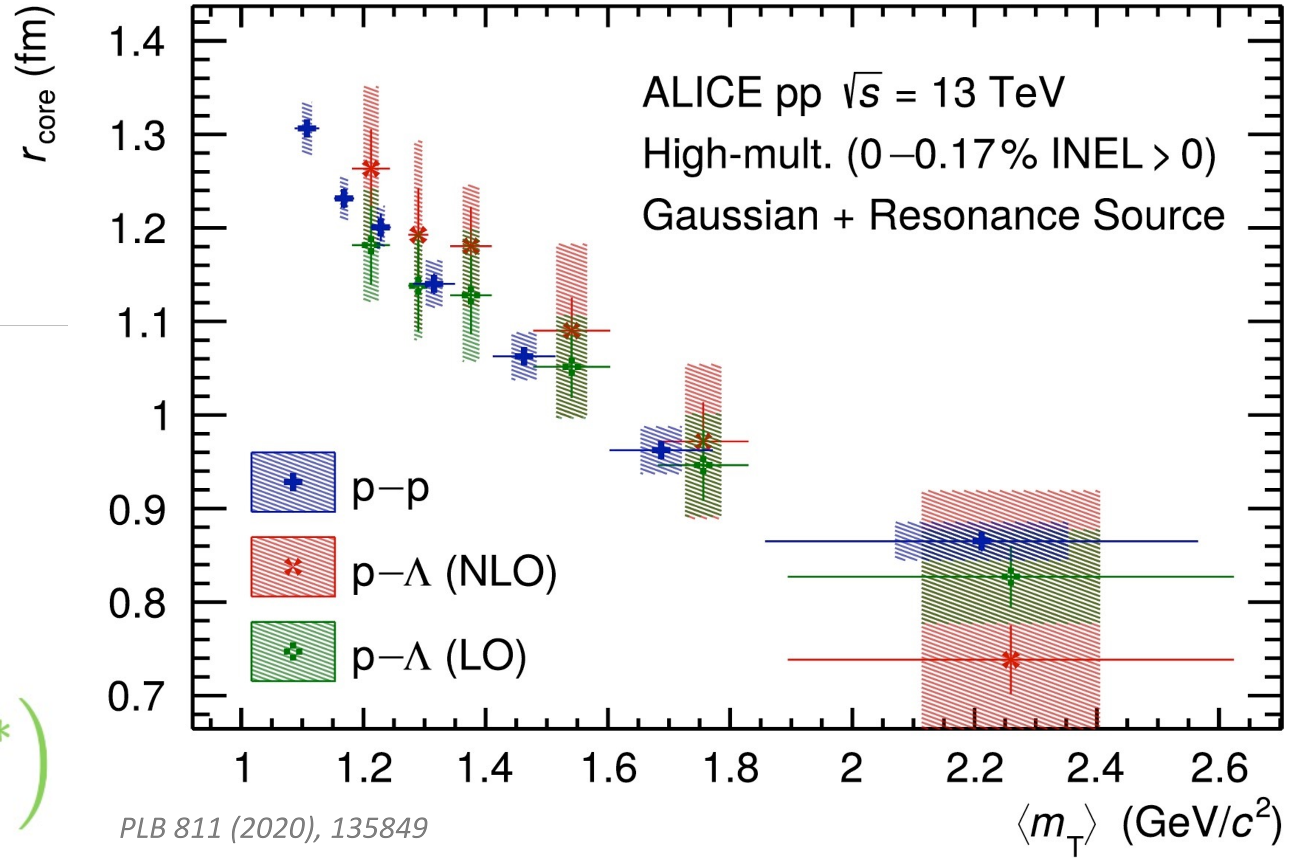

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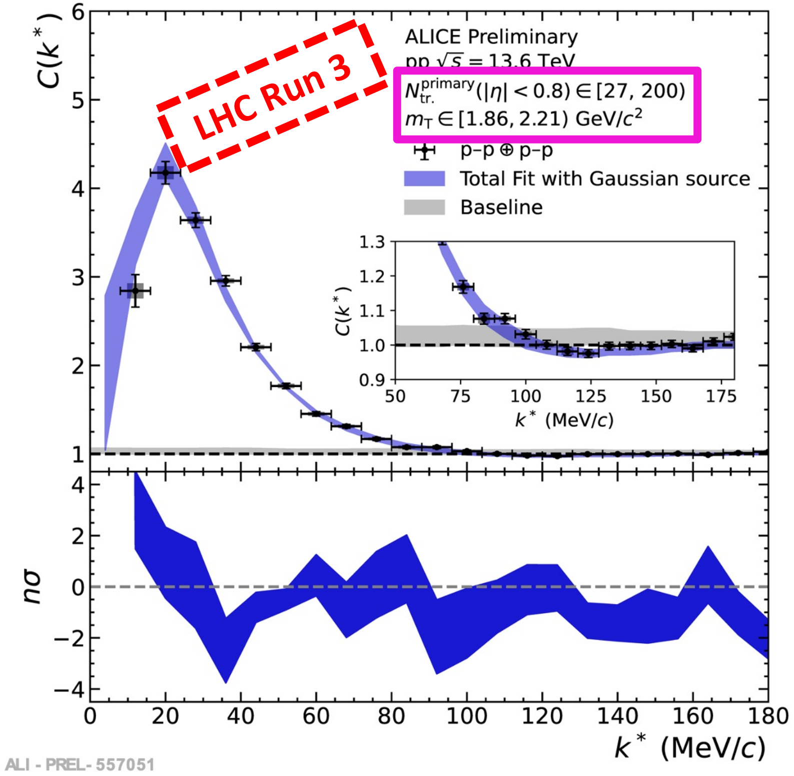
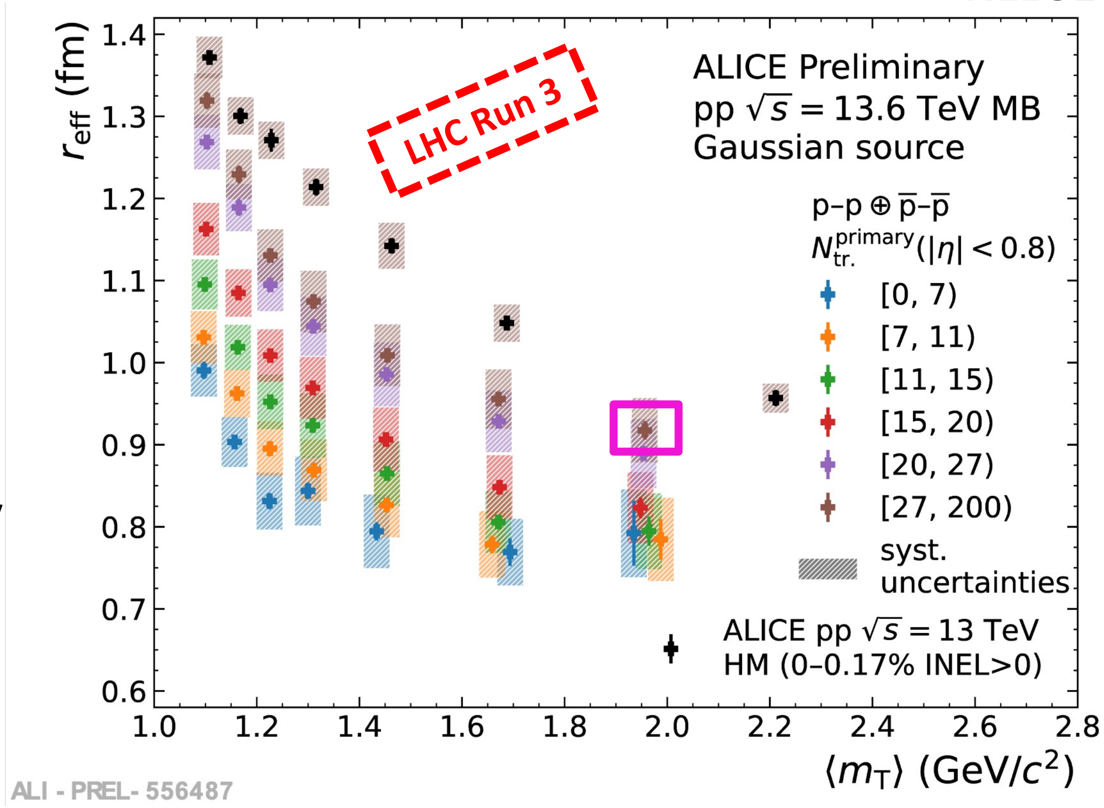
Current status: Starting femtoscopy in Run 3



600 billion MB events collected in 2022 alone

Observation:
Source radius increases with increasing multiplicity and decreases for increasing m_T



- First multiplicity and m_T differential measurement of p–p correlations
- First baseline measurement for constraining the source for all future femtoscopy studies in Run 3 with ALICE
  ➔ statistically limited channels and three body correlations accessible with Run 3 data
- Next steps: Extend source measurement to p–Λ and core source