

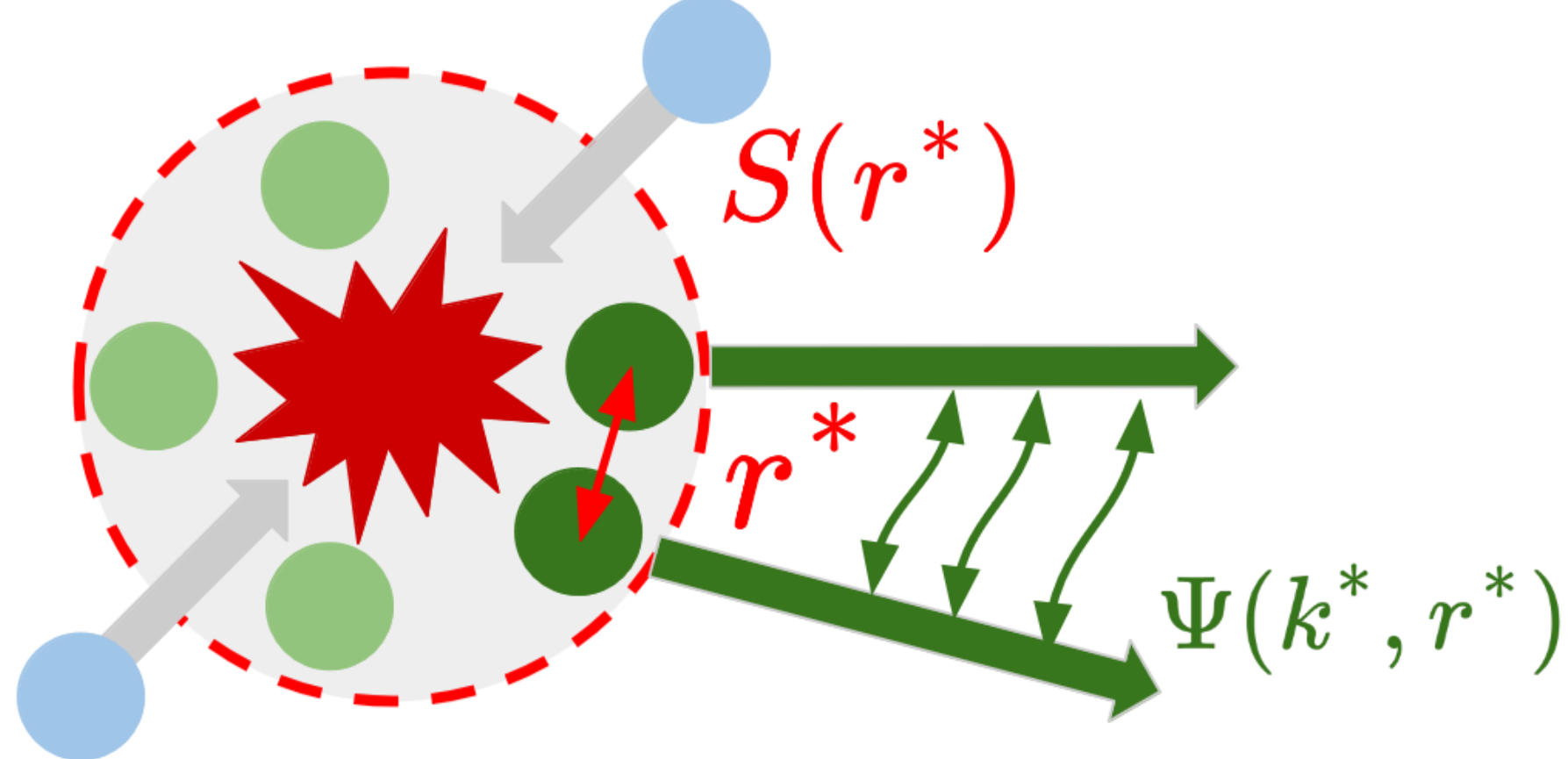
## Femtoscopy

$$C(k^*) = \underbrace{\mathcal{N} \frac{N_{SE}(k^*)}{N_{ME}(k^*)}}_{\text{Experiment}} = \underbrace{\int S(r^*) |\Psi(k^*, r^*)|^2 d^3 r^*}_{\text{Theory}}$$

Experiment

Theory

- The **correlation function**  $C(k^*)$  can be measured by computing the ratio of the same and mixed event distributions as a function of the relative momentum in the pair rest frame  $k^{*[1]}$

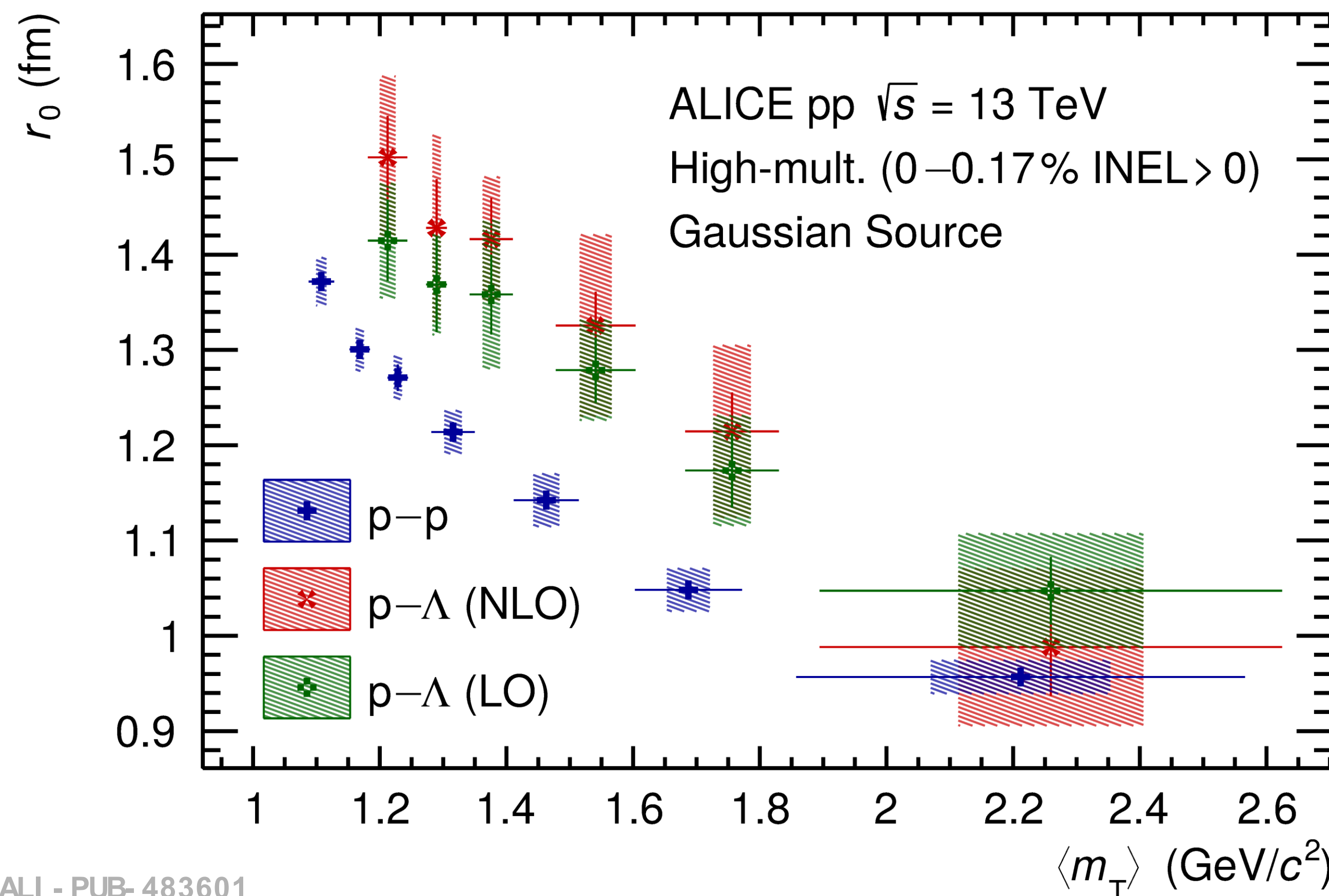


- Fitting theoretical models to measured **correlation function** give access to
  - the **two-particle wave function** by fixing the **source function**
  - the **source function** by fixing **two-particle wave function**

Study hadronic systems with known interactions to fix the source. This gives access to multi-strange, such as p-Ω<sup>[1]</sup>, and charmed systems

## Emission source

- Similar  $m_T$  **scaling of the effective source sizes** has been measured for p-p and p-Λ pairs in ultrarelativistic pp collisions at 13 TeV

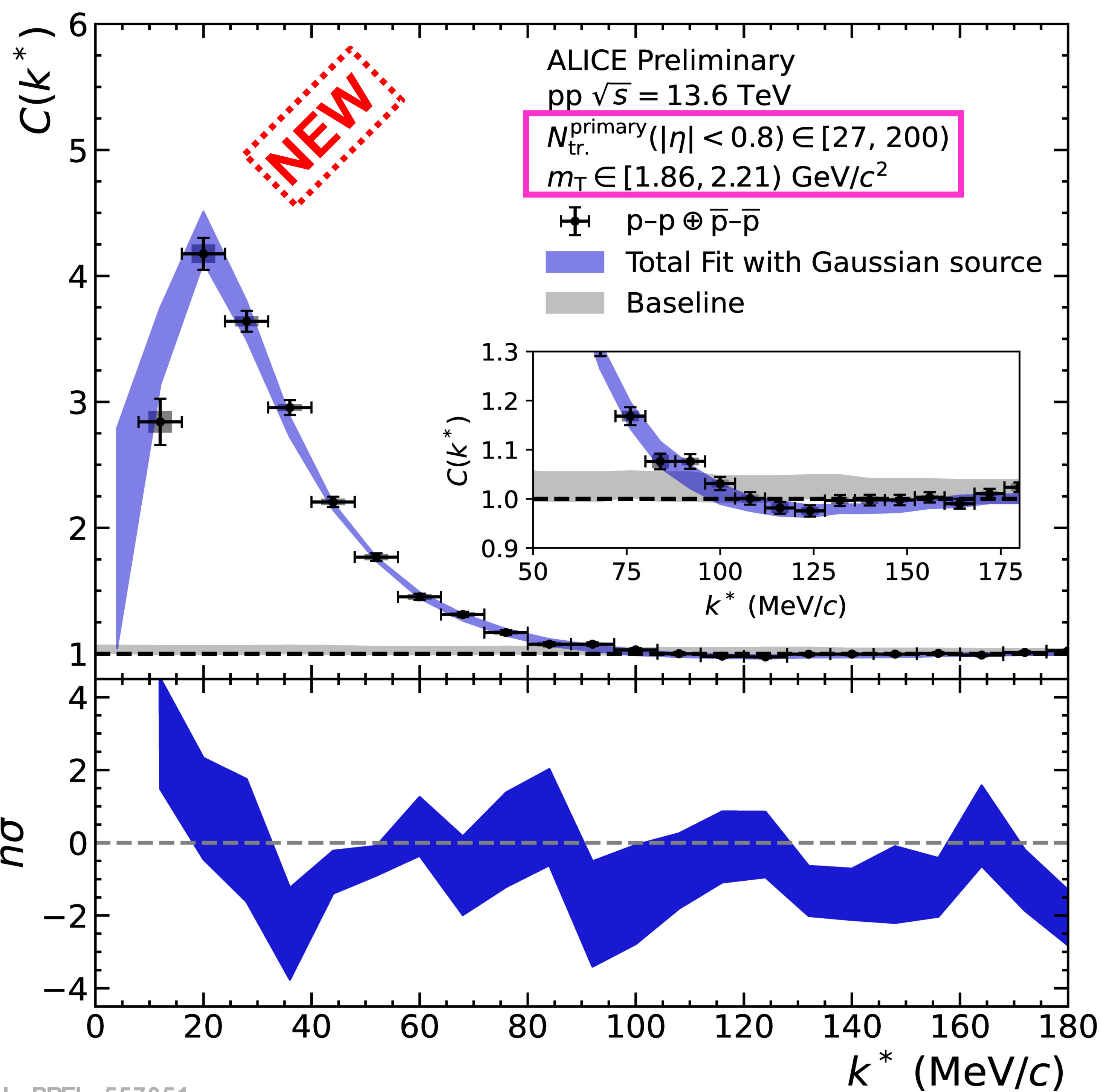


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- Proper treatment of short-lived resonances reveals a **common emission source** for all baryons with a universal  $m_T$  scaling<sup>[3]</sup>

Study the p-p and p-Λ interaction with ALICE in Run 3 at 13.6 TeV to enable future femtoscopic measurements

## Current and future femtoscopy measurements at 13.6 TeV



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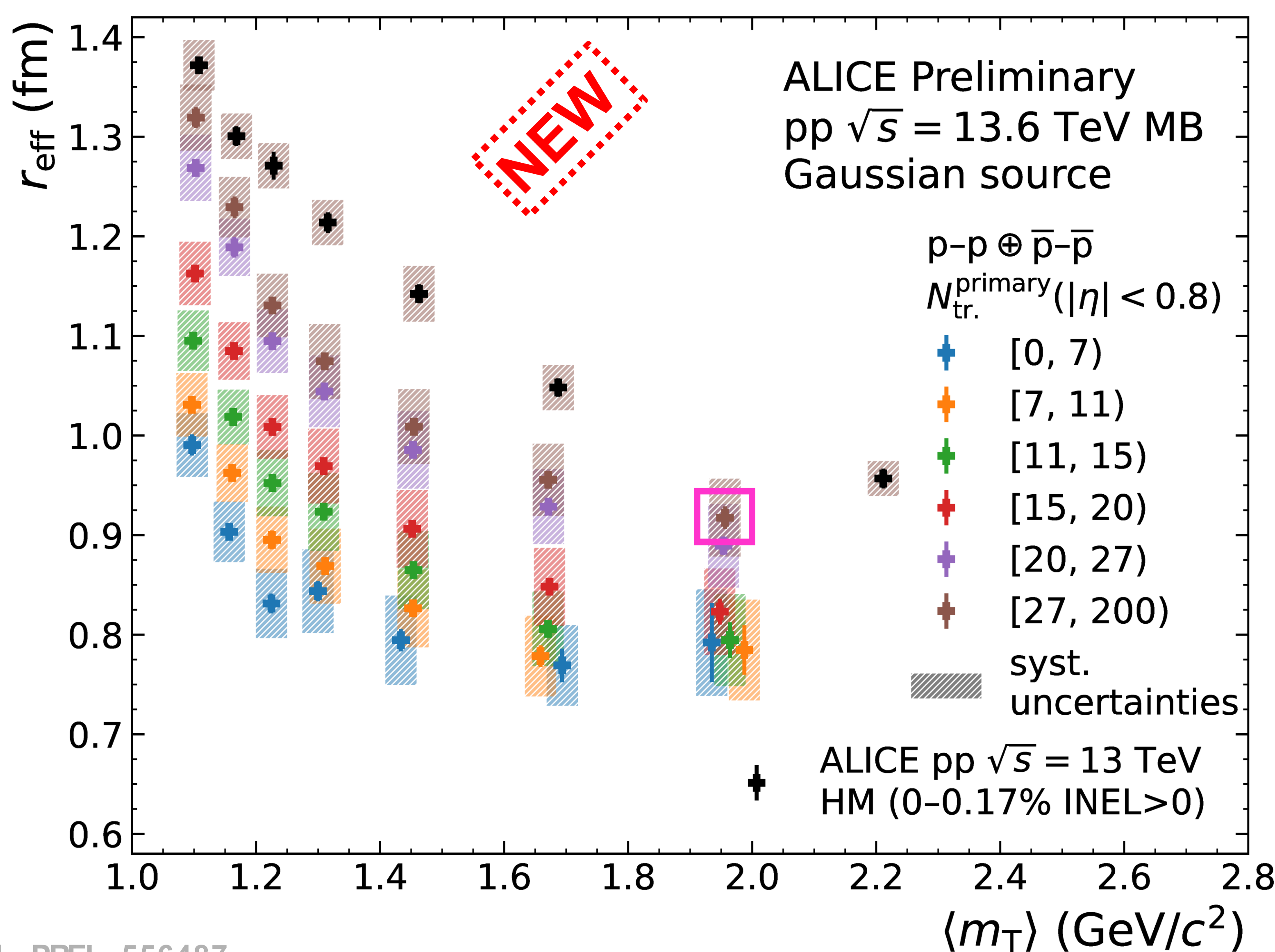
### Outlook on future femtoscopy measurements

- Measurement of the p-p and of p-Λ in similar multiplicity class to Run 2 High-mult. as a **benchmark for Run 3**
- Extract the common source size from p-p and p-Λ correlations in different multiplicity classes to **extend the common source model**
- Revisit previous measurements that were statistically limited in Run 2
- Precision measurements of **genuine three-body correlation** with dedicated software triggers

### First ever multiplicity and $m_T$ differential measurement of the p-p correlation function

- 600 billion** minimum bias events collected by ALICE from pp collisions at 13.6 TeV in 2022 alone
- Multidimensional measurement** of p-p correlations in 7  $m_T$  and 6 multiplicity bins
- Fitting the correlation function with CATS<sup>[4]</sup>** in each bin allows the extraction of the  $m_T$  scaling of the effective source size in different multiplicity classes
- Effective source size increases with multiplicity** and exhibits the expected scaling in each multiplicity class
- Scaling of the effective source size in largest multiplicity class [27, 200) not fully comparable to Run 2 High-mult. due to use of **different multiplicity estimators and percentiles**

First baseline measurement to constrain the source for all future femtoscopy studies for ALICE in Run 3



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