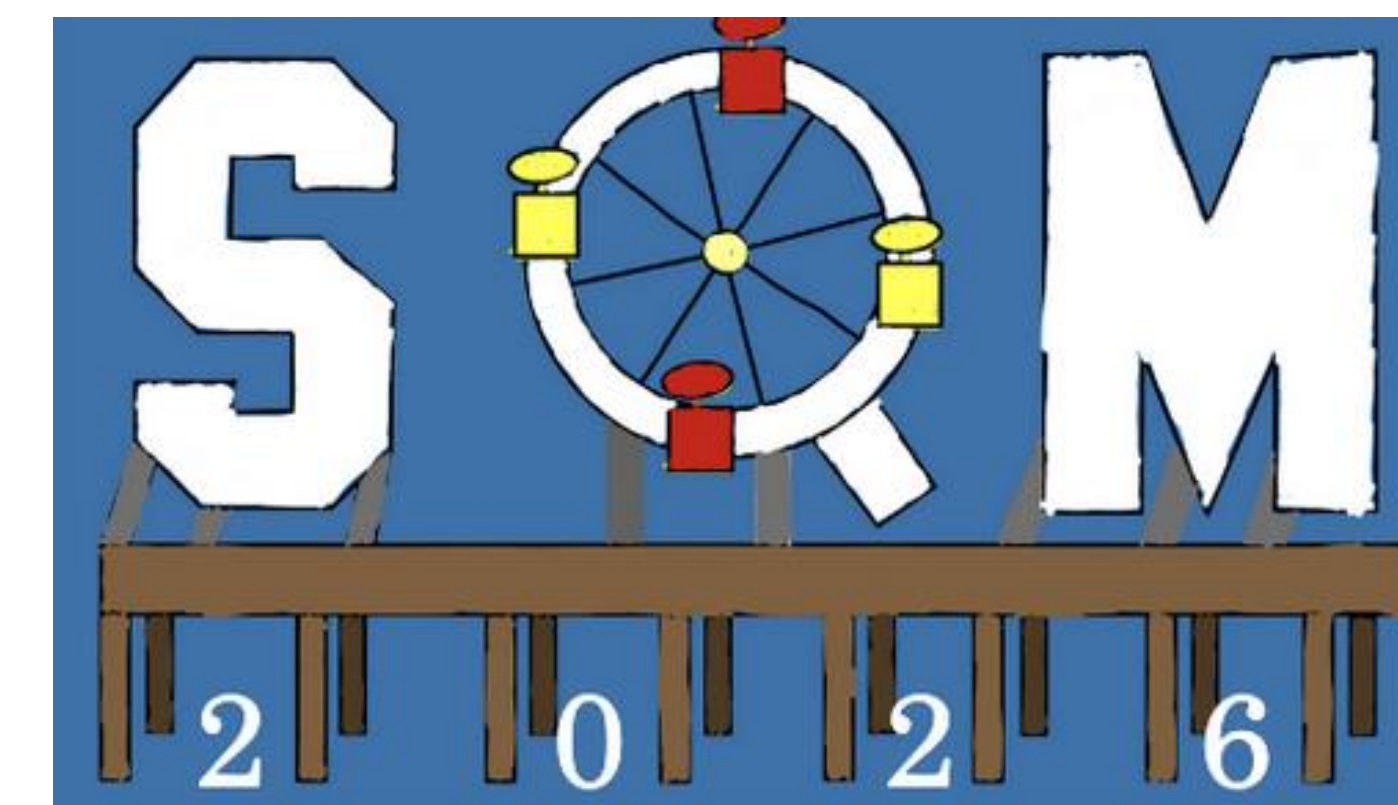


Strangeness Production at LHCb



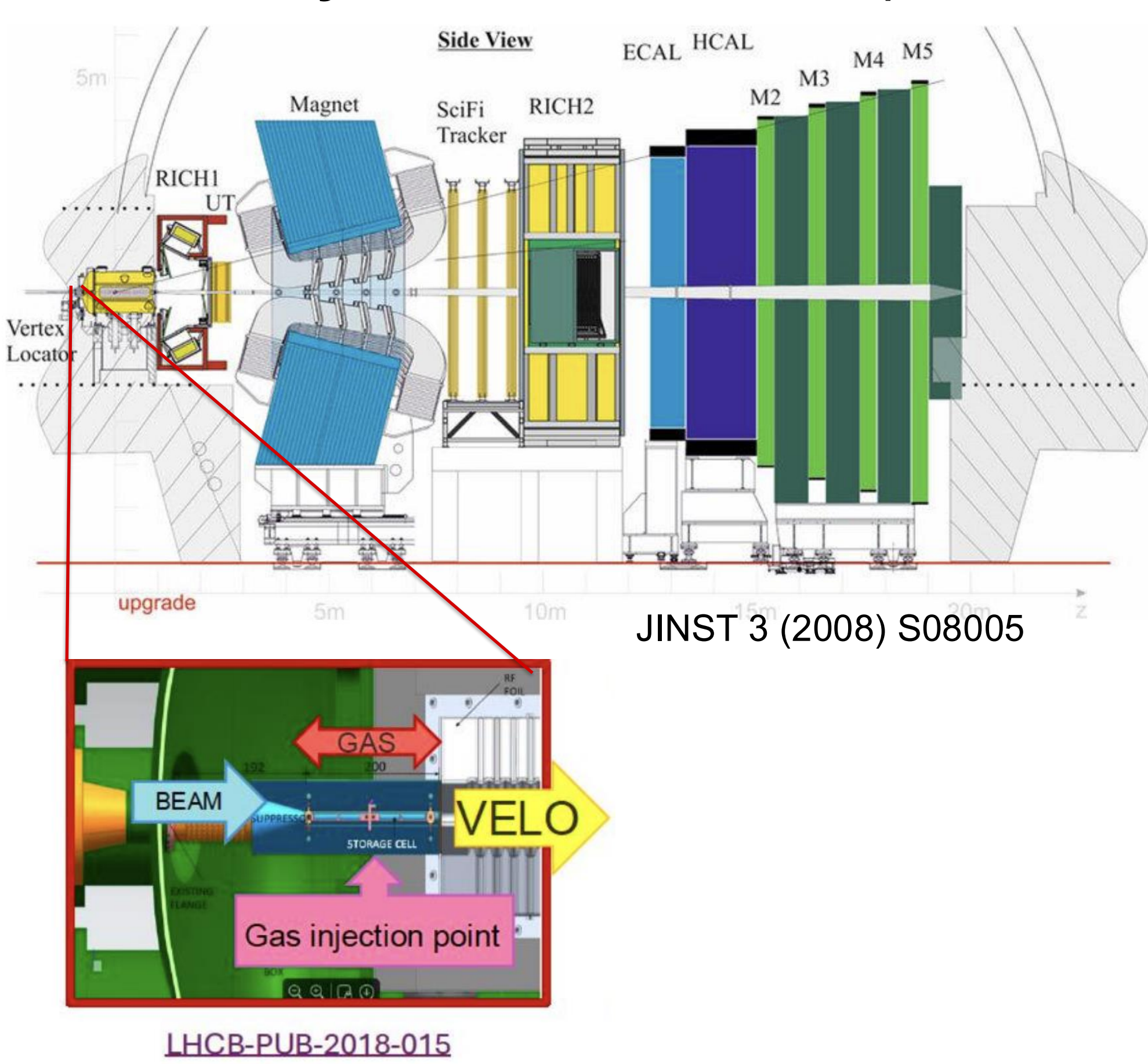
Julie Berkey (Napora), jlnelson@lanl.gov | On Behalf of the LHCb Collaboration

Strangeness in Quark Matter, 22-27 March, 2026, Los Angeles, CA



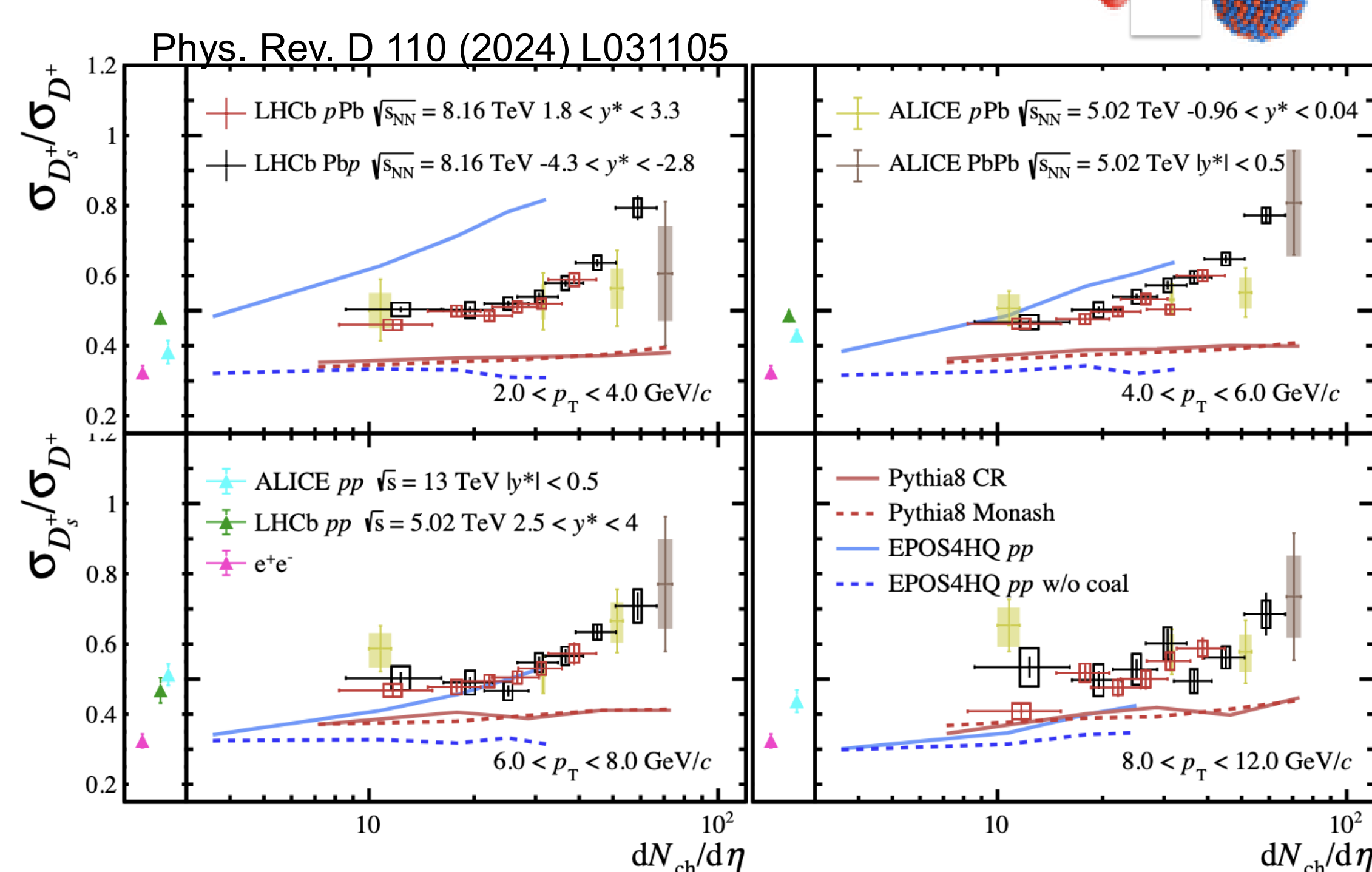
The LHCb Experiment

The LHCb Detector: Forward spectrometer with full tracking, particle ID, hadronic and electromagnetic calorimetry and muon ID in $2 < \eta < 5$



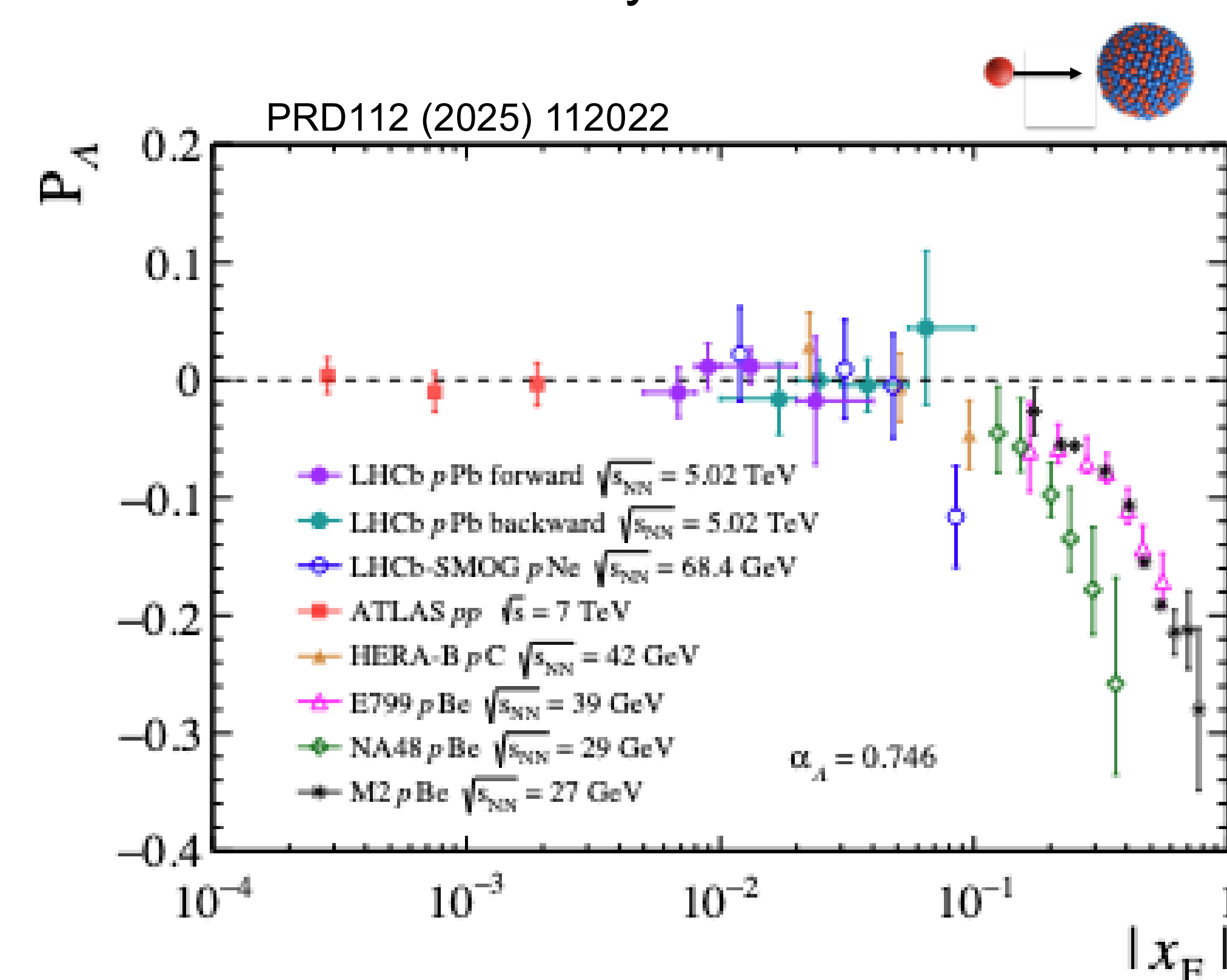
Strangeness Enhancement in Open Charm

- Heavy quarks move relatively slowly, making them especially sensitive to the QCD medium
- Production of mesons with strange quarks is expected to be enhanced in a dense hadronic environment



Transverse Λ Polarization in pPb and pNe

- Λ polarization cannot be explained by QCD
- LHCb data is consistent with world trend as a function of Feynman x.



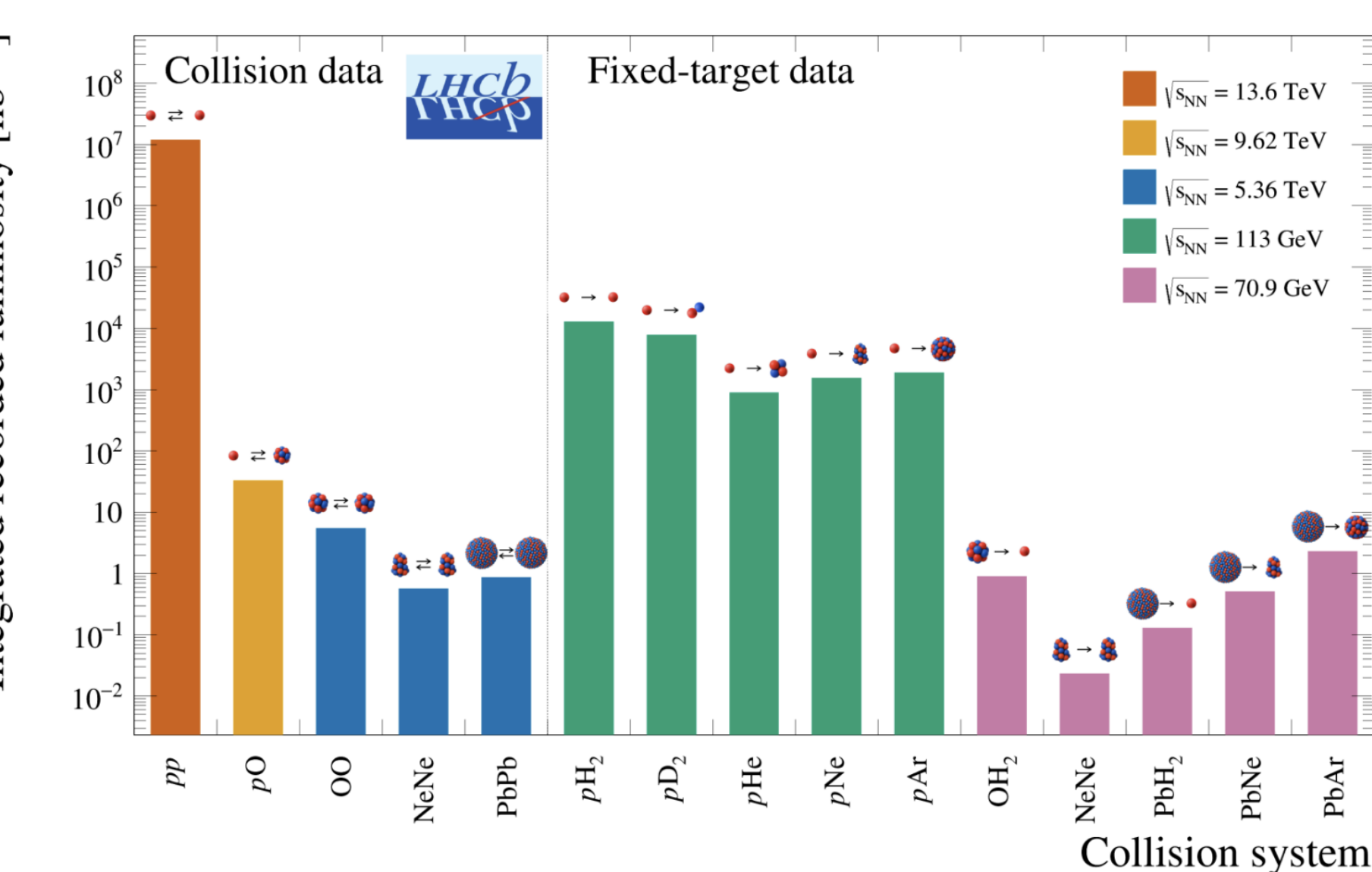
System for Measuring Overlap with Gas 2

Run 2 (2015-2018) Gasses: Ar, Ne, He
Beams: p, Pb

Run 3 (2023-2026) Gasses: Ar, Ne, He, H₂, D₂, Xe
Beams: p, Pb, O, Ne

Datasets taken in 2025

- 15 new datasets
- Collider mode
- Fixed Target



With SMOG2, fixed target and collision data can be taken simultaneously!

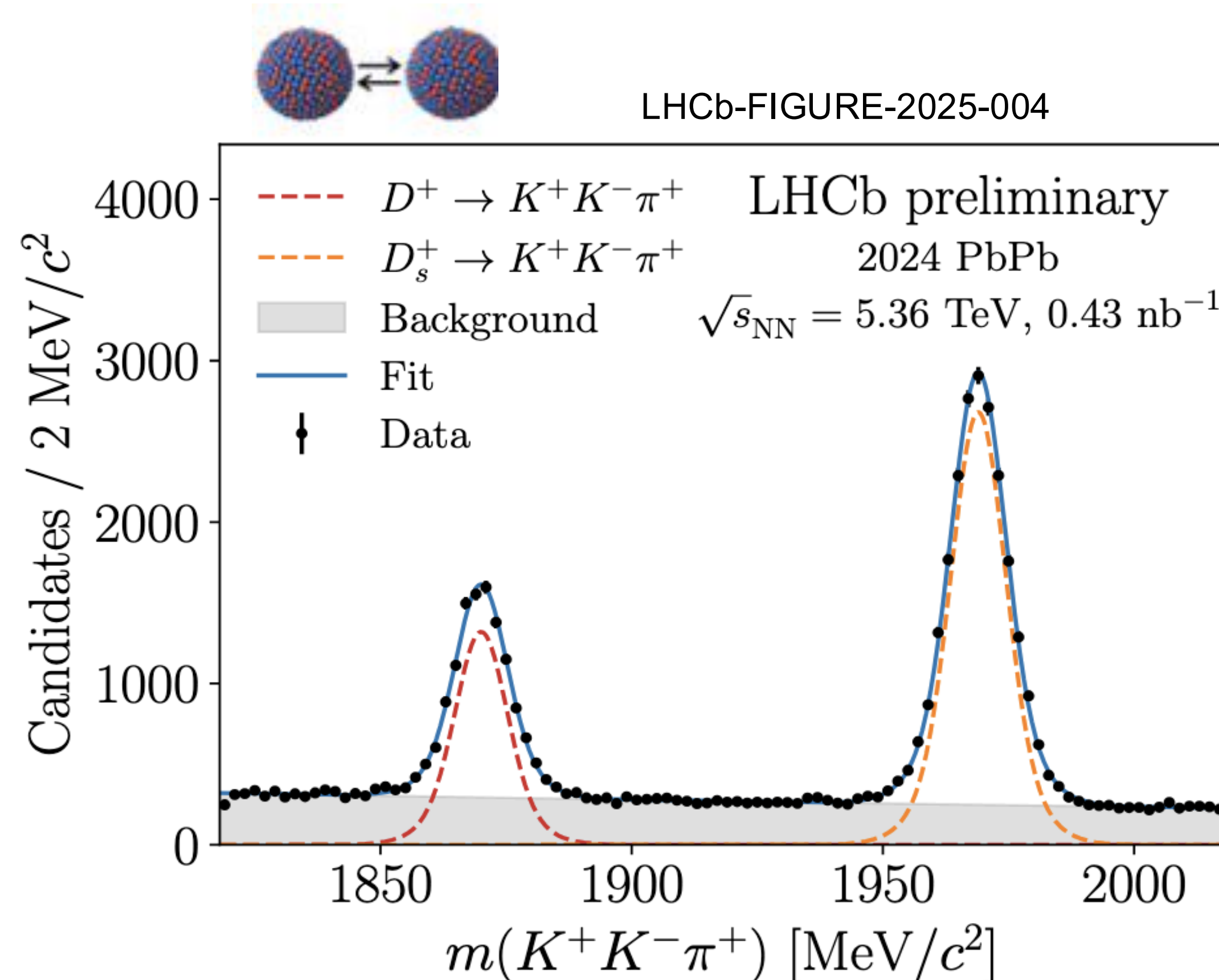
Los Alamos National Laboratory is supported by the US Department of Energy Office of Science/Nuclear Physics and Early Career Awards Program

- $\sigma_{D_s^+}/\sigma_{D^+}$ as a function of charged particle multiplicity
- Cross-section ratio cancels out initial state effects and is dominated by final state effects
- Clear enhancement of the D_s^+ as charged particle multiplicity increases
- Models fail to describe the data

Behavior cannot be described by fragmentation alone!

Open Charm Mesons in 2024 PbPb Data

- D_s^+ and D^+ candidates in the $K^+K^-\pi^+$ channel



Polarity Violation?

- Λ polarization evident at highest x_F value measured by LHCb
- No clear dependence on p_T
- LHCb forward data $1.5 < y^* < 4$
- LHCb backward data $-5 < y^* < -2.5$

