Activity at Jeonbuk Nat. Univ.

KoALICE workshop

January 4, 2022

Eun-Joo Kim

Current Status

- Members
  - Eun-Joo Kim
  - Junlee Kim (JL): PhD course
- Analysis from JL
  - Light flavor resonances: $f_0(980)$ analysis
  - Two-Particle Correlations: flow and jet measurement
  - Luminosity with O2Physics

Plan: Slide from March 2017

Research Plan

- Short term physics topics in 2017-2018
  - Spectra and cross-section measurements for light flavor resonances
  - Comparison of the above results with the results of the central diffractive events
- Long term physics topic after 2018
  - Flows of heavy flavors
  - Jet Physics with two-particle correlations
- ALICE upgrade project : collaborative effort within KoALICE on ITS upgrade project

Silde from Feb. 2021

Summary & Outlook

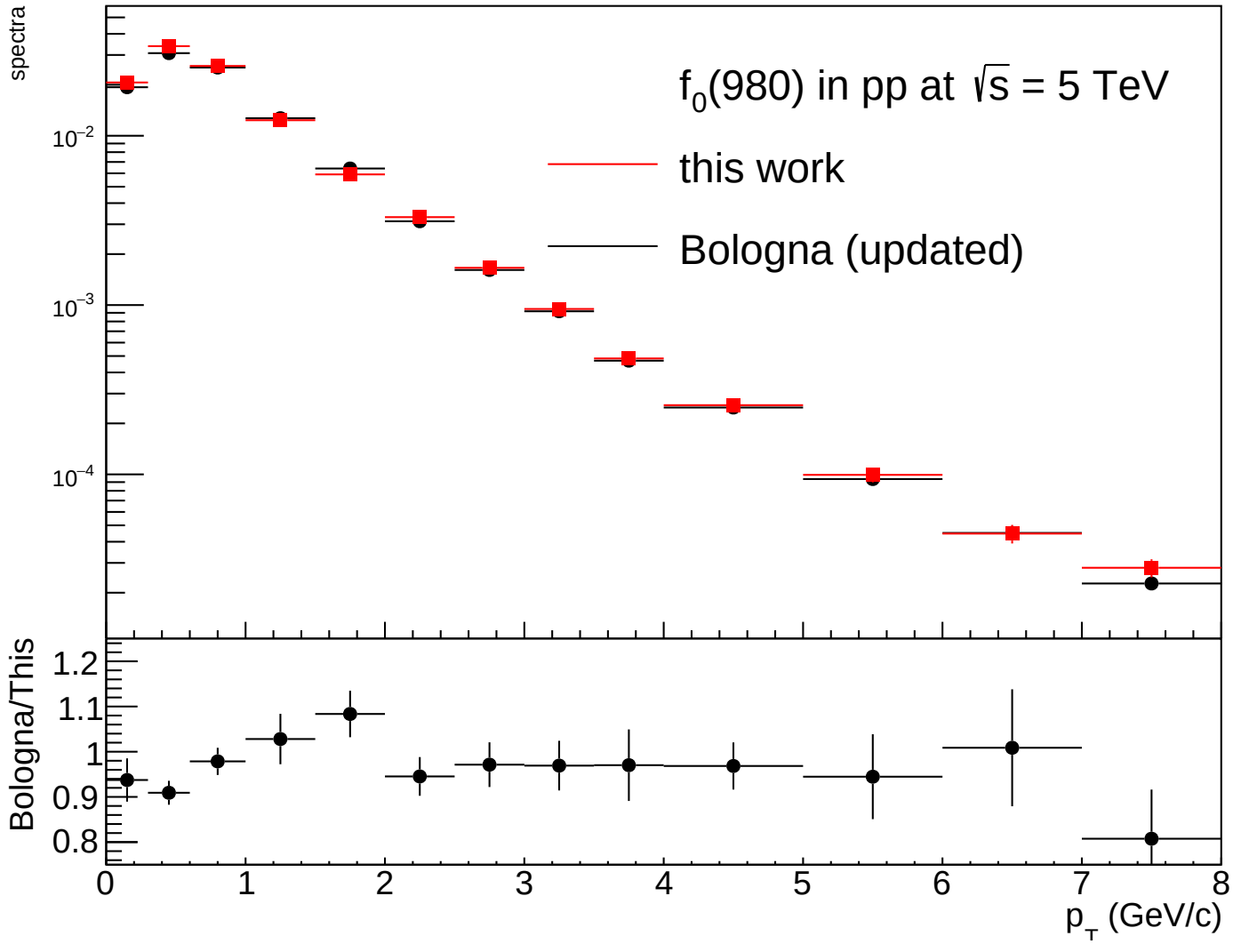
- Light flavor
  - pp@5.02 TeV : cross-check
  - R_{pPb} : approval from ARC
  - Pb-Pb collision system : keep going
- Ridge (flow)
  - paper draft : May 2021
  - Collaboration Round : December 2021
- Service work
  - Luminosity measurement with PNU
  - Assignment : (maybe) July 2021

Summary: Activity in 2021

- Light Flavor
  - pp@5.02 TeV: cross-check
  - R_{pPb}: approval from ARC
  - Pb–Pb collision system: keep going
- Ridge (flow)
  - paper draft: May 2021
  - Collaboration Round: December 2021
- Service work
  - Luminosity measurement with PNU
  - Assignment: October 2021
- Shift
  - on-line shift at PNU in July 2021

Status: $f_0(980)$ analysis in pp collisions

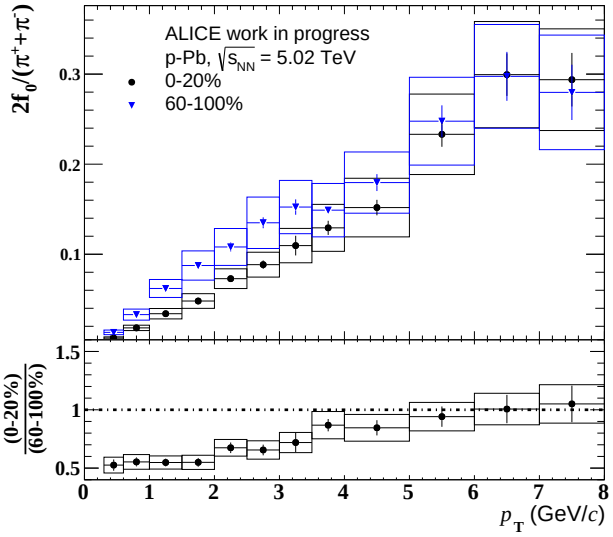
- pp@5.02 TeV: cross-check

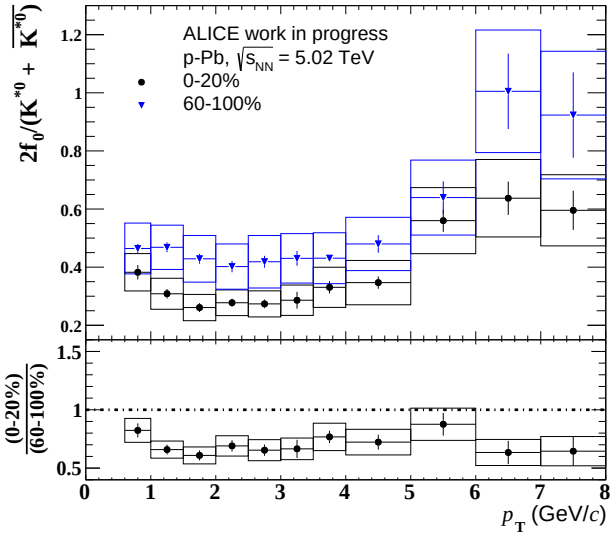


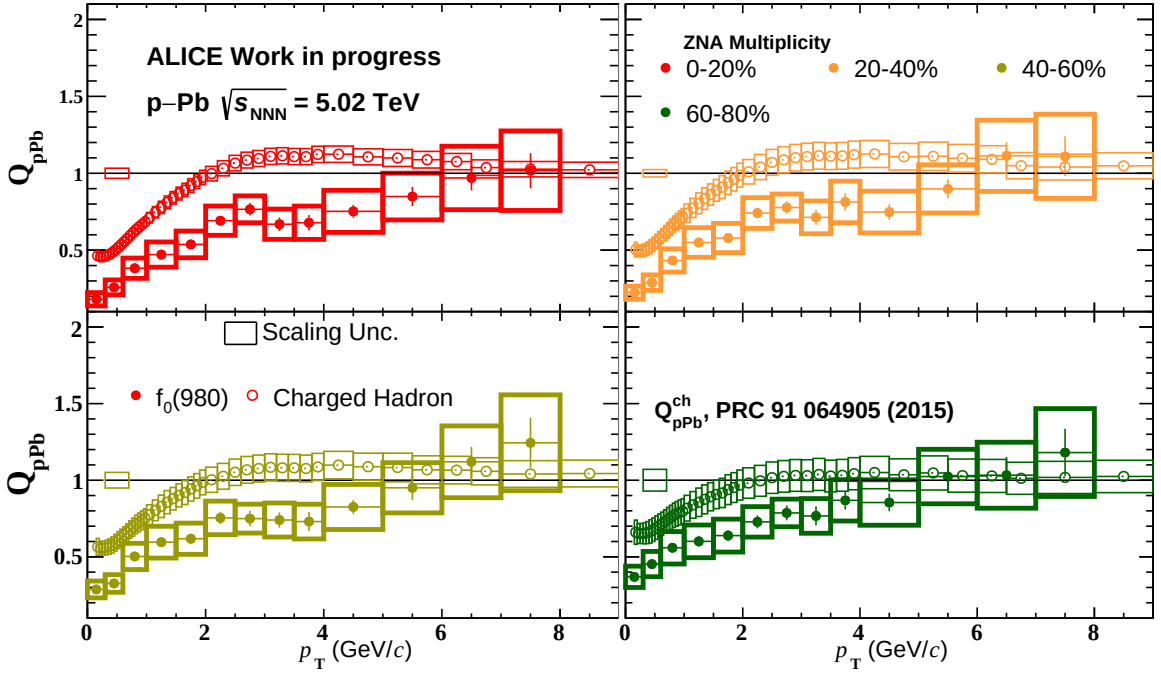
Status: $f_0(980)$ analysis

- p–Pb collisions:
  - Paper proposal for $f_0(980)$ results in p–Pb@5.02 TeV
  - Discussion with theoriest is on-going
  - Under model calculations
- Pb–Pb collisions:
  - Result was presented, and analysis is on-going
  - Start analysis to measure v_2

Status: $f_0(980)$ analysis in p–Pb colliisons



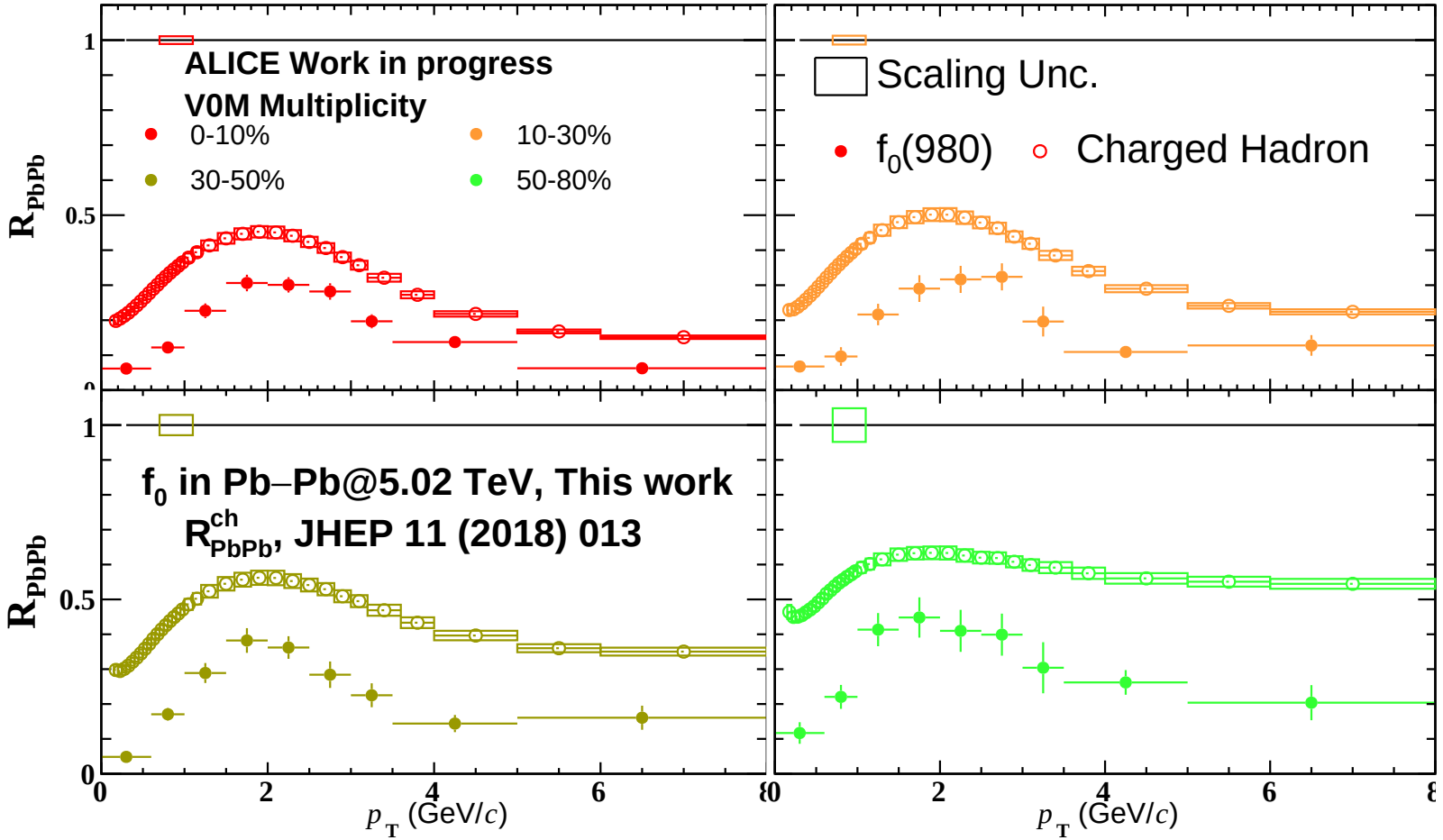




Status: Paper proposal

- Title:
  Multiplicity dependence of $f_0(980)$ production
  in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV
- PC: Junlee Kim (Chair),
  Eun-Joo Kim, Sanghoon Lim, Beomkyu Kim
- Target journal: PRL (JHEP or PLB)
- What we observed:
  - Re-scattering effect with $f_0(980)$ in p–Pb collisions
  - Weak strangeness enhancement
  - Q_{pPb}: no Cronin peak in the intermediate p_T range
- Can we suggest the $f_0(980)$ internal structure?

Updates: $f_0(980)$ analysis in Pb–Pb collisions

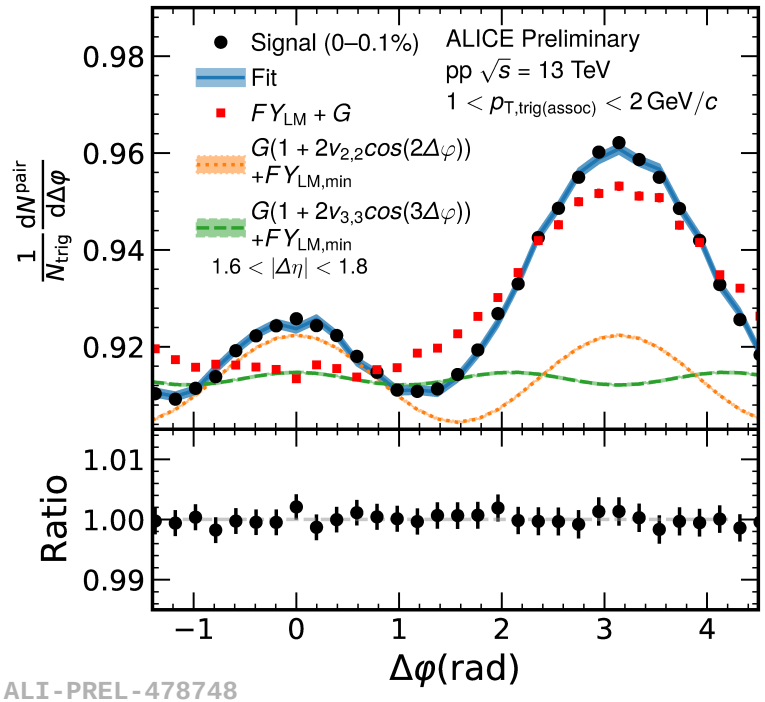


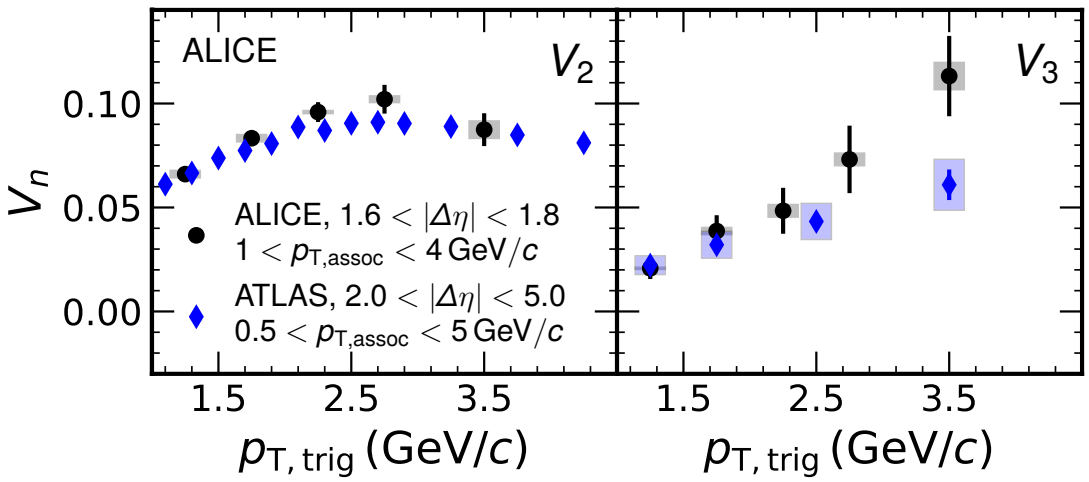
- pp results: https://alice-publications.web.cern.ch/node/7410
- $R_{AA}(f_0)$ was measured and compared with $R_{AA}(h^{\pm})$

Status: Flow and Jet

- Ridge paper was published: JHEP05(2021)290
- Flow and Jet fragmentation
  - Approved as preliminary results for IS2021
  - Analysis Note: updated
    https://alice-note.web.cern.ch/node/1097
  - Additional studies for paper proposal
    - Particle Composition Correction (PCC)
  - Talk: PHENOmenal(May 2021), ATHIC2021(November 2021)

Updated: Flow extraction



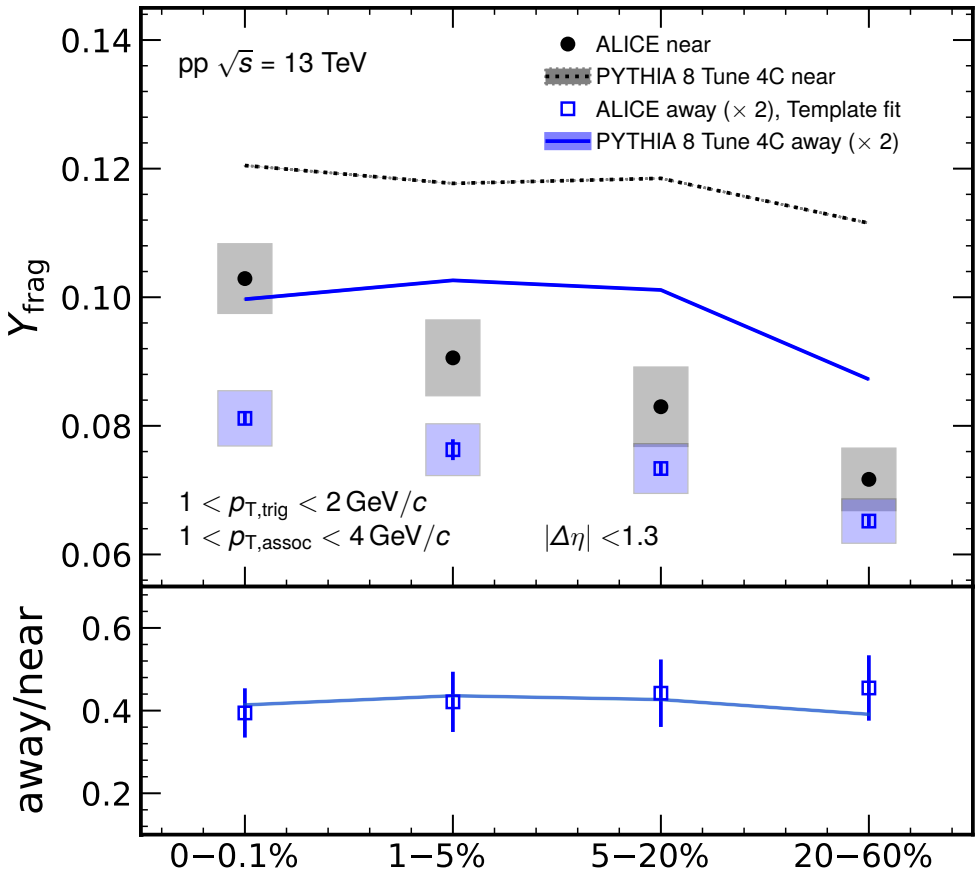


- Flow components were extracted with the template fit method

$$Y(\Delta\phi) = G(1 + 2v_{2,2}\cos(2\Delta\phi) + 2v_{3,3}\cos(3\Delta\phi)) + FY_{LM}(\Delta\phi)$$

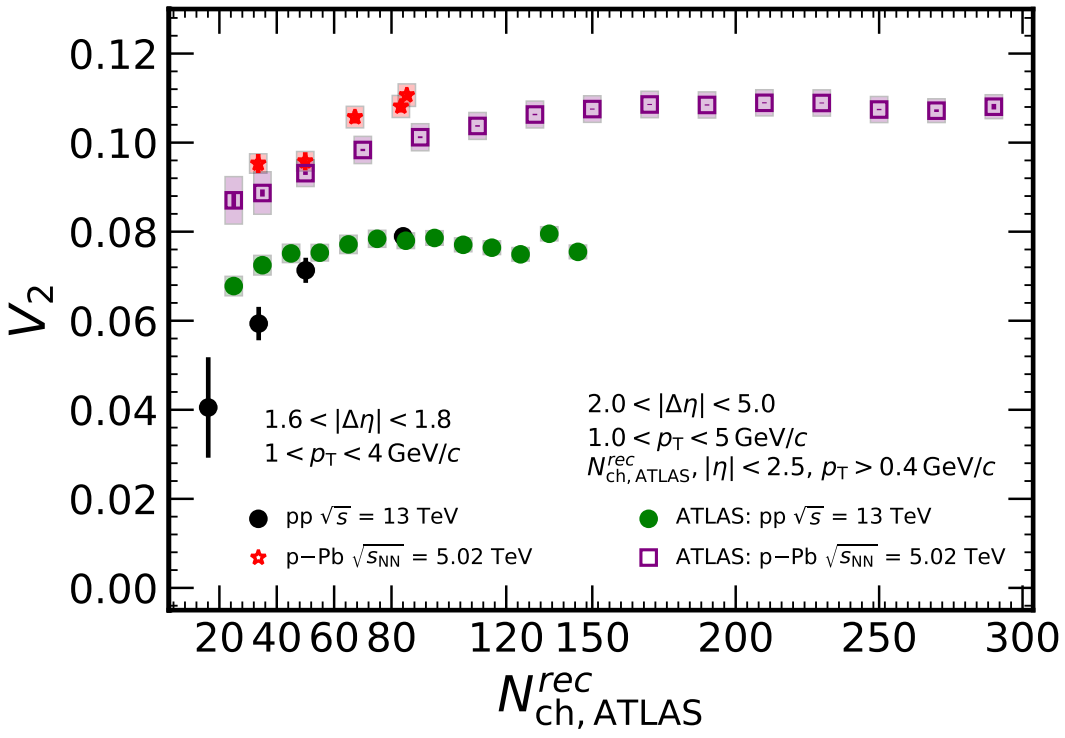
- v_n value: comparable with ATLAS results

Updated: Test for flow extraction method



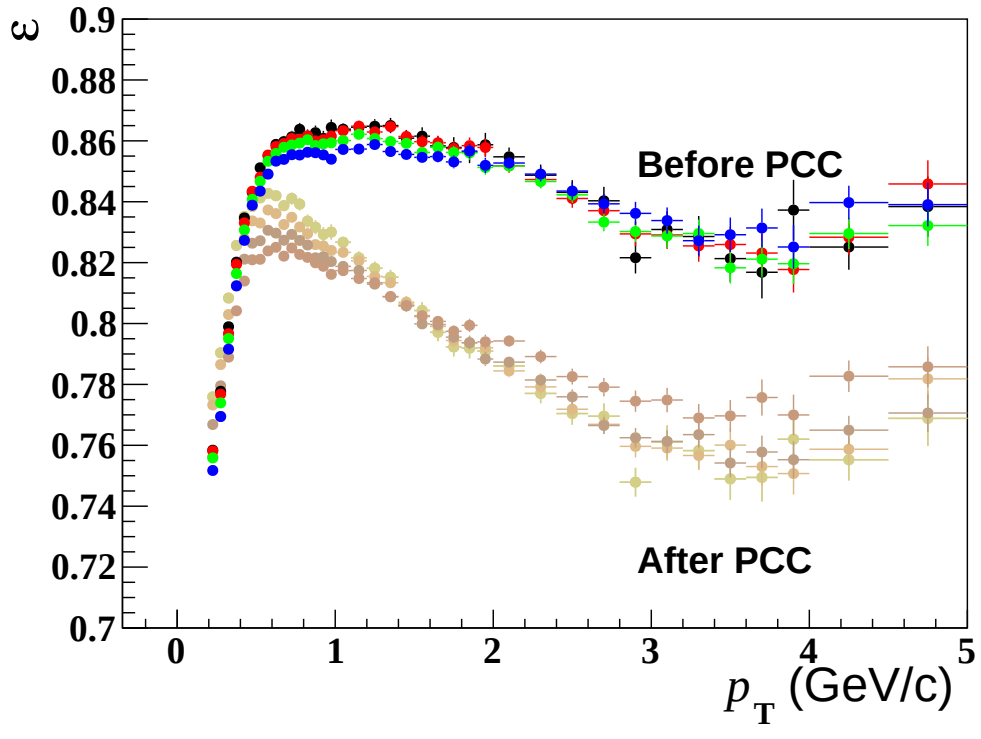
- Jet fragmentations were measured to test the scale factor F
- Away-side/near-side: pure pseudorapdity acceptance effect
- acceptance effect: agreed with PYTHIA8

Result: Multiplicity dependent v_2



- Converted multiplicity from ALICE to ATLAS
- Can we talk about constraints on the size of the system where v_2 does not exist ???

Result: Particle Composition Correction

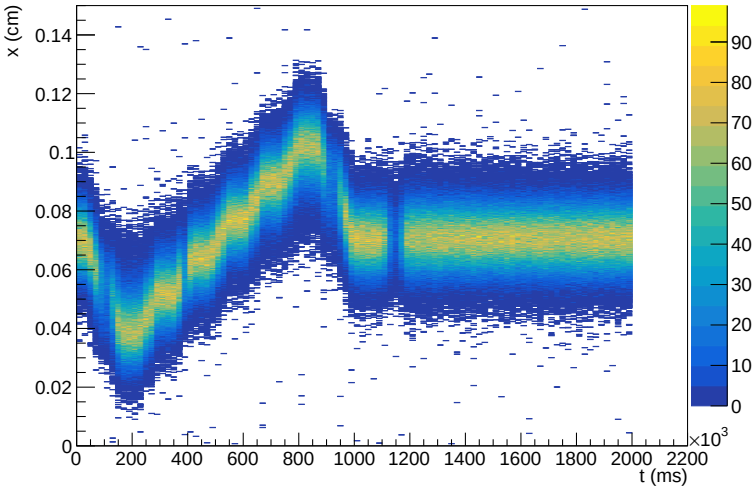


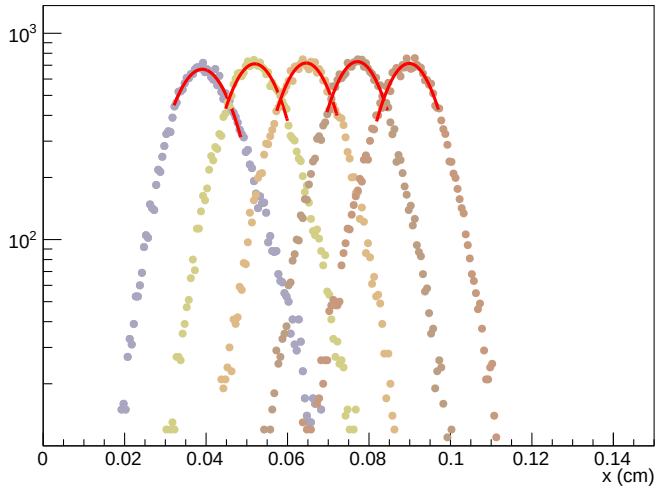
- Data driven correction for particle composition from MC generation

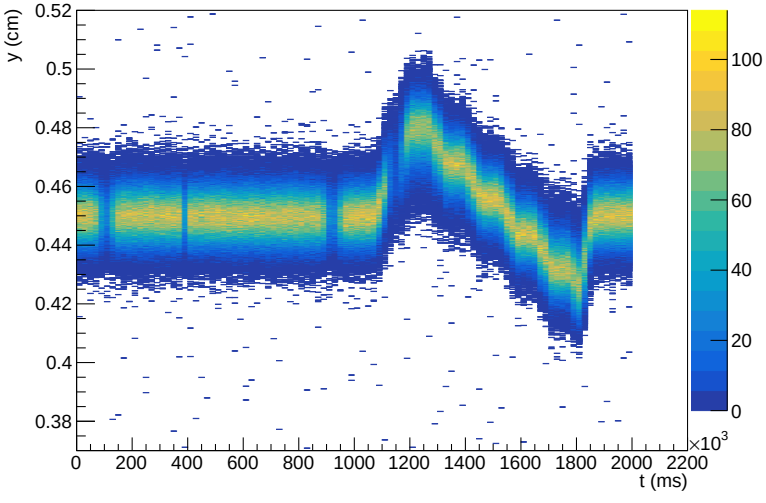
Status: Service work

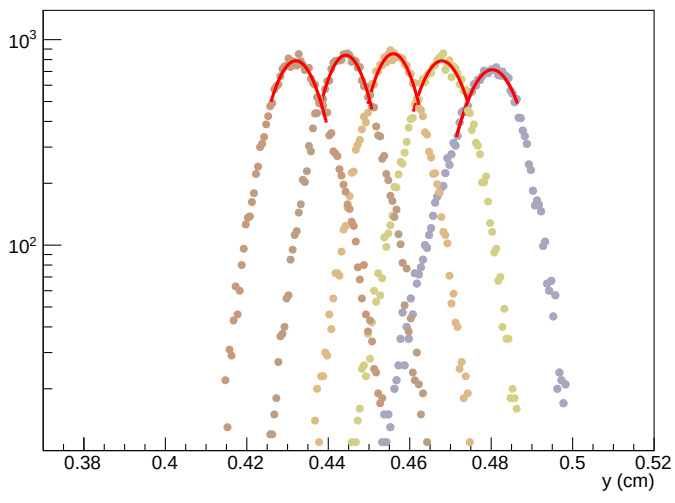
- Analysis code was merged into O2Physics master and will be improved
- Length Scale Calibration (LSC): on-going

Luminosity: Length Scale Calibration









- Converted Run2 AO2D data were analyzed

Plan for 2022

- Light Flavor
  - p–Pb analysis
    - model study: March or April 2022
    - Collaboration Round: December 2022
  - Pb–Pb: keep going, further analysis for v_2
- Flow
  - analysis: applying PCC
  - paper proposal: September 2022
  - Collaboration Round: December 2022
- Service work
  - Luminosity measurement with PNU
  - Contribution to PAG luminosity: March 2022
- Talk: QM? SQM?
- JL: PhD Defense (Novermber 2022)