

# Heavy Ion Rivet – suggestions to proceed

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Rivet @ MCnet

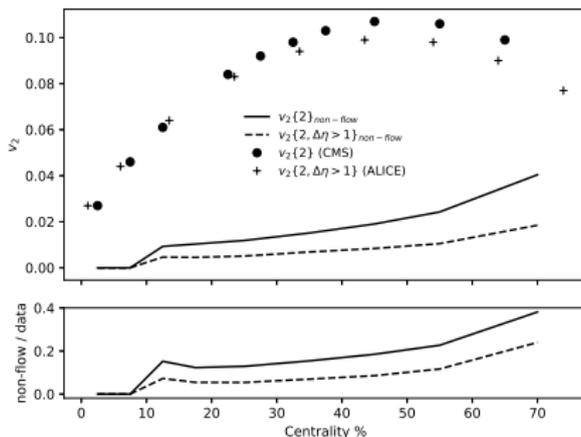
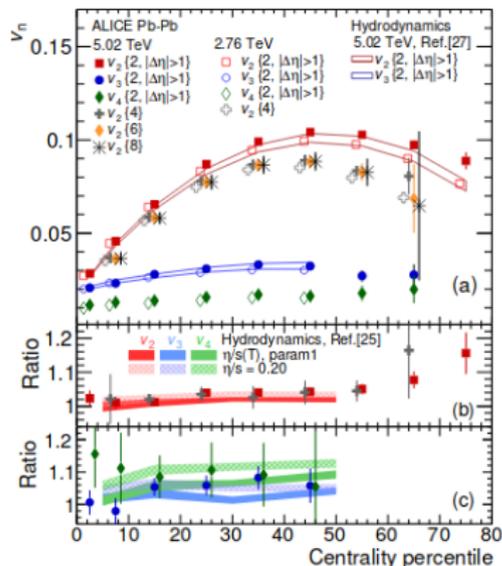


# HI Rivet – not just for heavy ions

- The HI community have realized the need for a Rivet-like tool.
- Prerequisite: Heavy Ion specific analysis tools!
- Not just for HI – small system collectivity need analyses as well, requires similar methods.
- Current status: Many scattered projects.
  - ① HI Rivet + HepDATA (JFGO et al).
  - ② Jet quenching analyses (Zapp et al).
  - ③ Various centrality estimates (LL/Rivet core devs).
  - ④ Soft QCD observables (CB).
  - ⑤ (JETSCAPE, Snowmass for HI, EPOS validation, ALICE particle definitions, ...)
- Can we converge on a single tool?
- *Should we* converge on a single tool? Yes!
  - ① Necessary for true apples-to-apples.
  - ② Experimentalists should not do double work.
- Today: My own scattered project + how can we proceed?

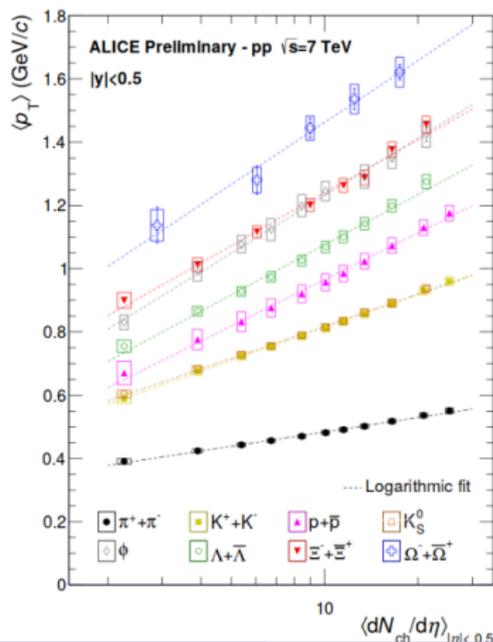
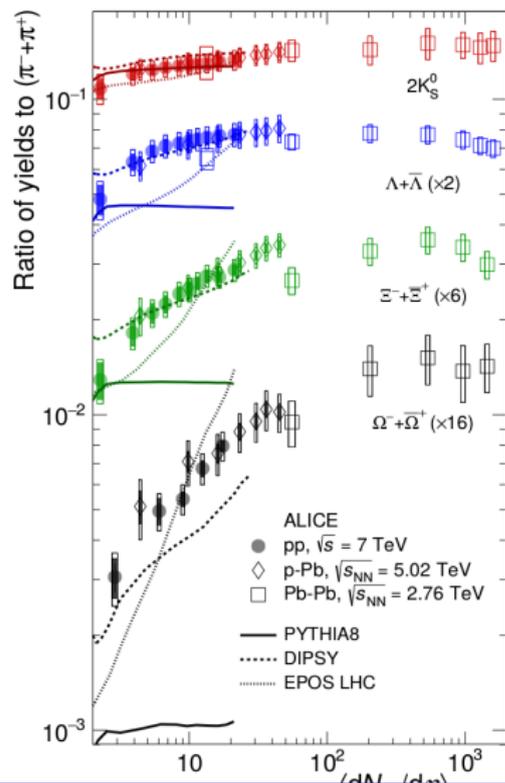
# Flow observables

- Measuring anisotropies – several existing methods.
- Particularly suited for Rivet:
- Implementation similar to sphericity tool + own centrality estimation.
- Thoroughly validated against ALICE ROOT based analysis.
- Next step: Differential in  $p_{\perp}$ , merge with Rivet centrality.



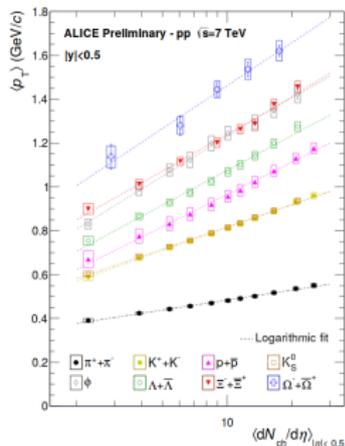
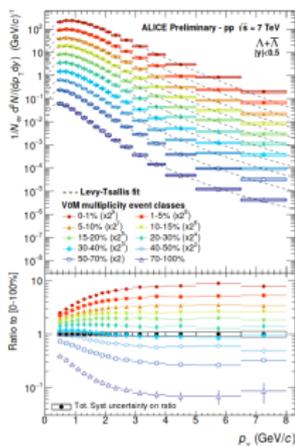
# Spectrum fitting

- Strangeness enhancement and radial flow ( $\langle p_{\perp} \rangle (N_{ch}, pid)$ ).
- Interest also from pp generators.



# Problematic extrapolation

- Levy-Tsallis fitting introduces a model uncertainty.

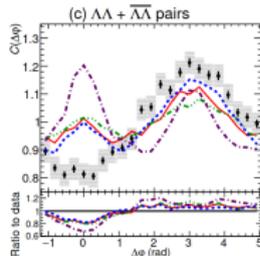
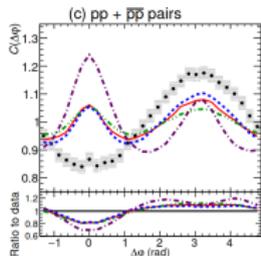
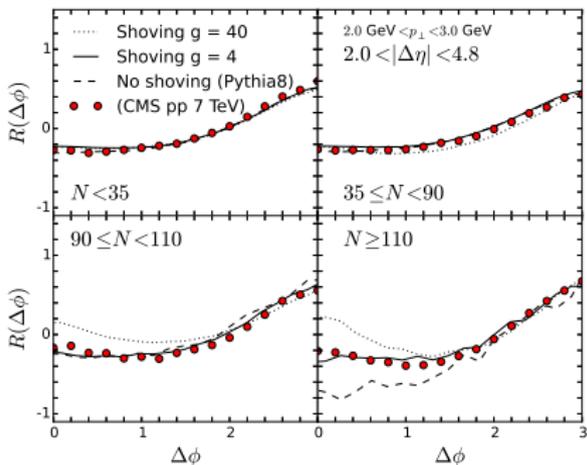


(L. Bianchi for ALICE: arXiv:1604.6736)

- Published figures use this – but spectra are also public.
- Possibilities: Include fitting in Rivet or integrate published spectra directly?

# Event mixing (arXiv:1710.09725 [hep-ph], arXiv:1612.08975 [hep-exp])

- Mixing signal events with uncorrelated min bias events to produce "background" for particle correlations.
- (Not always the optimal choice, but used by experiments).
- Solution implemented which gives a mixed projection: Currently being tested by experimentalists.
- Need inclusion in Rivet + validated analysis.



# How to proceed?

- Need to bring the right people in the same place – and write some code.
- Book them, and they will come!
- Workshop where we:
  - 1 Converge on a set of baseline tools/projections.
  - 2 Produce sample/PoP analyses for: multiplicity in several systems, jet quenching, strangeness, exotics, flow.
  - 3 Focus on code, not talks.
- Suggestion: Copenhagen, August 2018. Week 33 or 34.
- Local organizers: CB, J. Monk (ATLAS + Rivet), Y. Zhou (ALICE).
- Would require backup from the existing Rivet community.
- Invite as many scattered projects as possible.