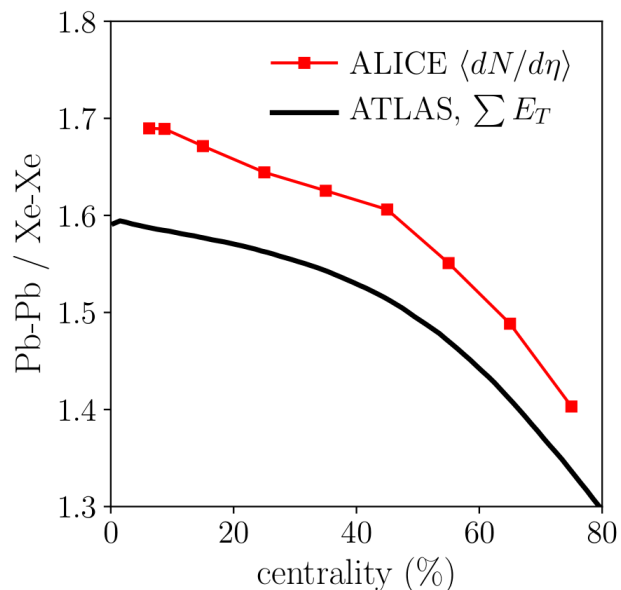


The initial state – Opportunities in O-O

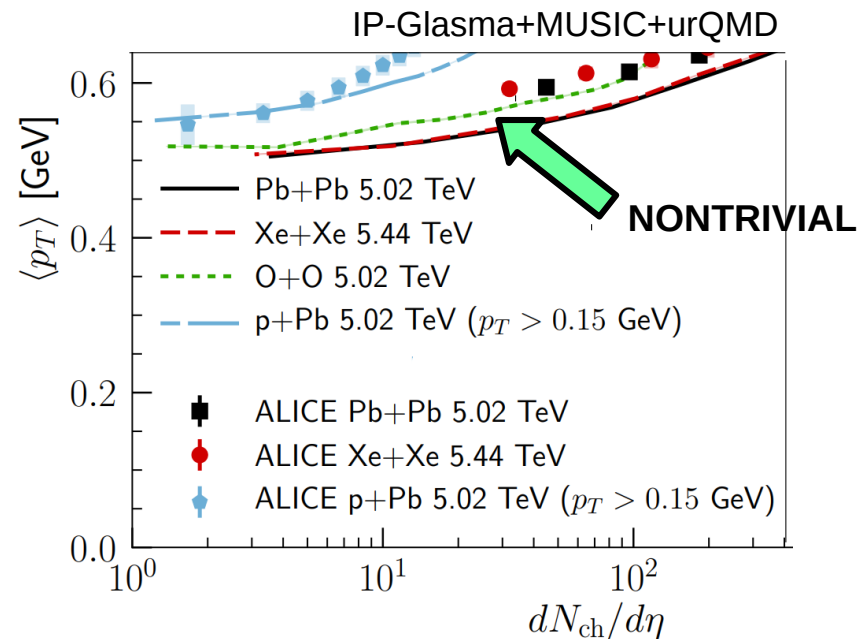
Concrete questions/possibilities (hydro perspective)

$dN/d\eta$ PARTICLE PRODUCTION



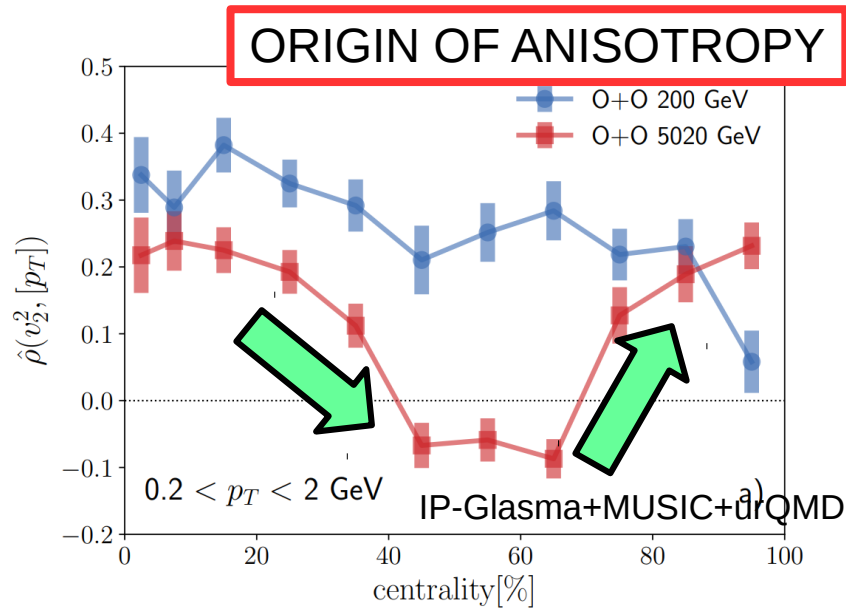
- Driven by energy deposition scheme.
- May be sensitive to first fm/c.
- Outstanding handle from O-O.

$\langle p_T \rangle$ THERMODYNAMICS (EOS)



- Onset of ‘small system’ (overdensity in O-O).
- Size-flow conversion probes the EOS.

Vn{2,4} – ANISOTROPY

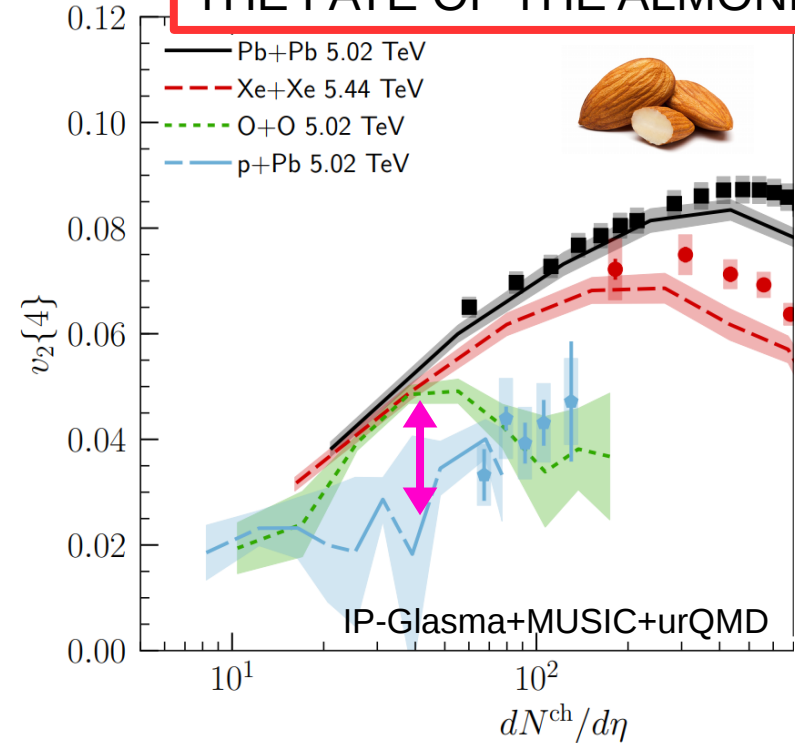


- Response to initial anisotropy beyond T^{A00} .

$$\mathcal{E}_p \propto \langle T^{xx} - T^{yy} \rangle + i \langle 2T^{xy} \rangle$$

- Funny signatures in V_2 - $\langle p_T \rangle$ correlation.

THE FATE OF THE ALMOND

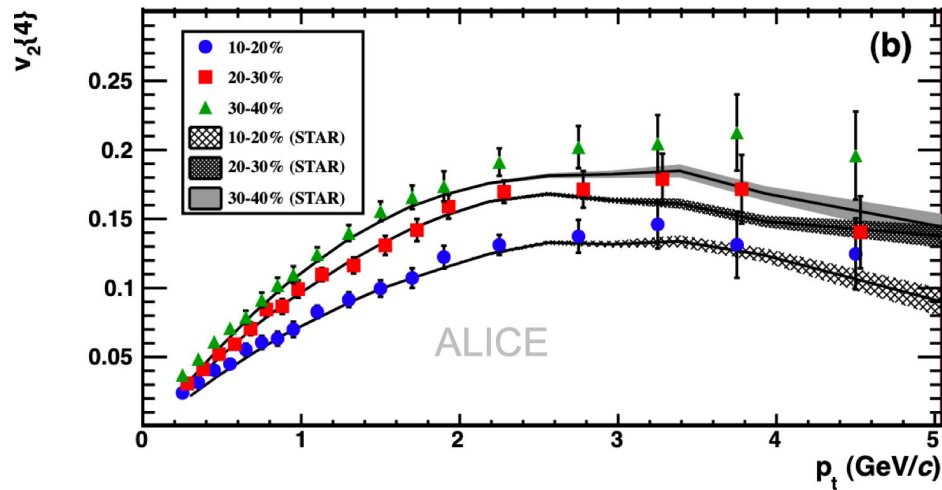


- Almond shape. ON: O-O, OFF: p-A
- “Centrality” has a meaning (same Npart).
- May be sensitive to structure of 16O.

Nucleon vs subnucleonic fluctuations?

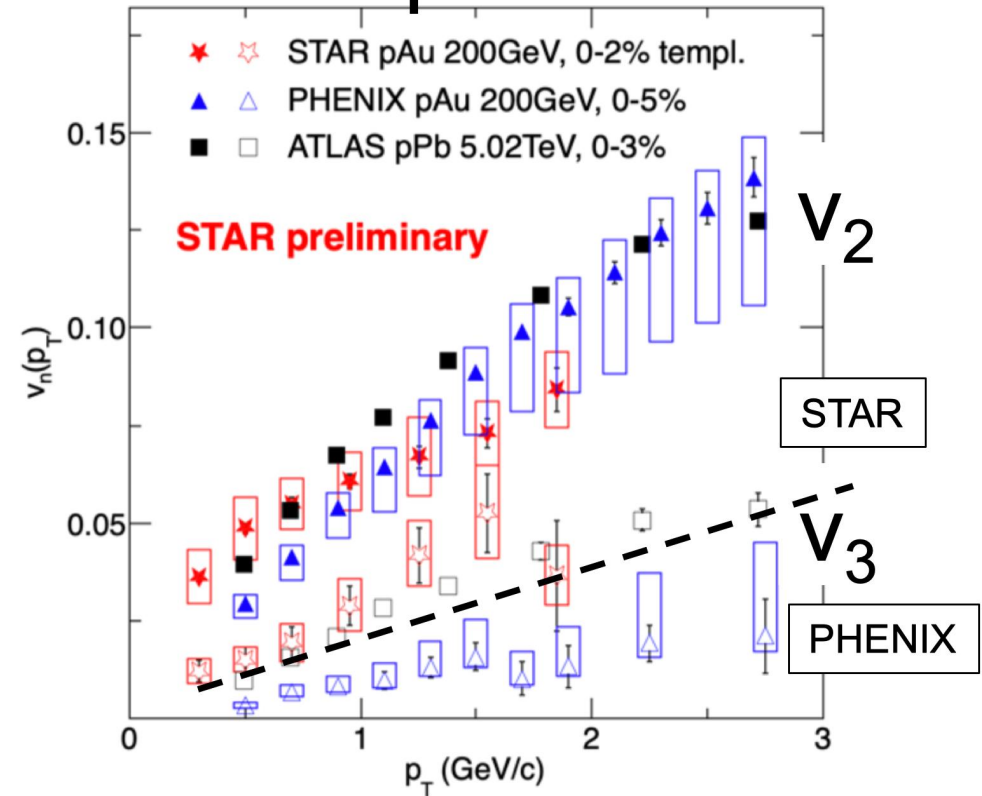
1

AA



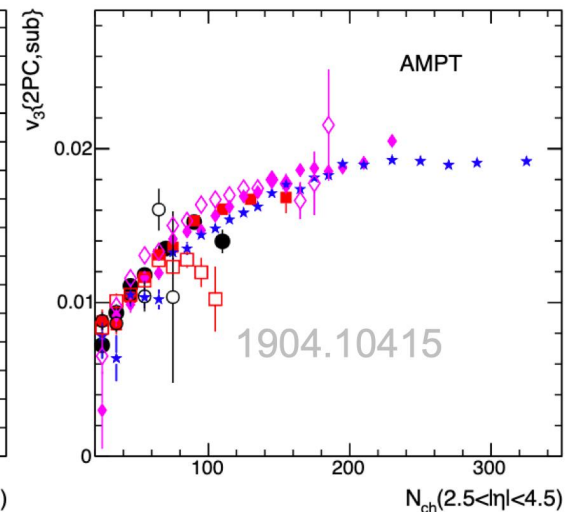
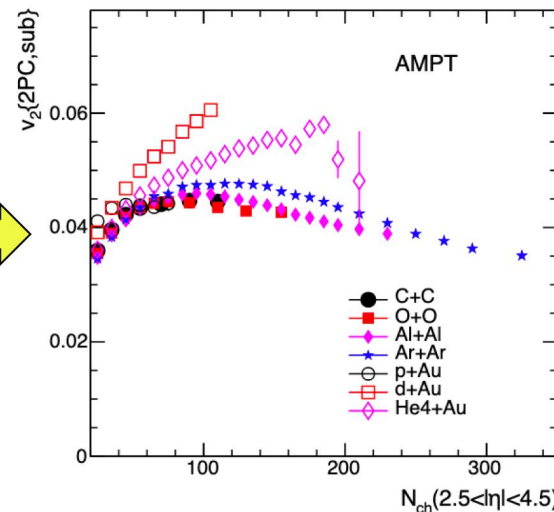
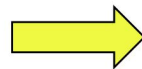
$v_n(p_T)$ agrees between PbPb and AuAu!
 $v_n(p_T)$ agrees between pPb and pAu?

pA



How about $v_n(p_T)$ in OO?

Information on the scaling behavior
 across different small systems:



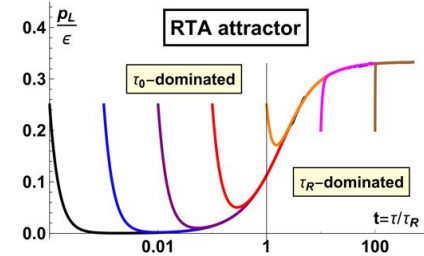
Do small system serve a new form of QCD matter?

Because of asymptotic freedom, the properties of QCD matter would evolve as a function of scale.

There are accumulating hints for the “phase transition/crossover” with varying length/time scale , e.g.

- Different physical origin of early- and late-time attractors.
- Different nature of early-and late-time slow modes.
- hydro/non-hydro onset transition seen in kinetic theory.

- ★ Can “far-from-equilibrium” QGP be a new form of QCD matter (phase)?
- ★ “Order parameter” and observational consequences in small systems?



Kurkela, van der Schee,
Wiedemann, Wu PRL 2020

