My suppression, your flow, his Cronin-effect -- our insight

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The nuclear modification factor – specifically its suppression – gave us many insights into the interactions in the sQGP

Azimuthal asymmetries (elliptic flow among them) gave us many insights into bulk properties, EoS of the sQGP

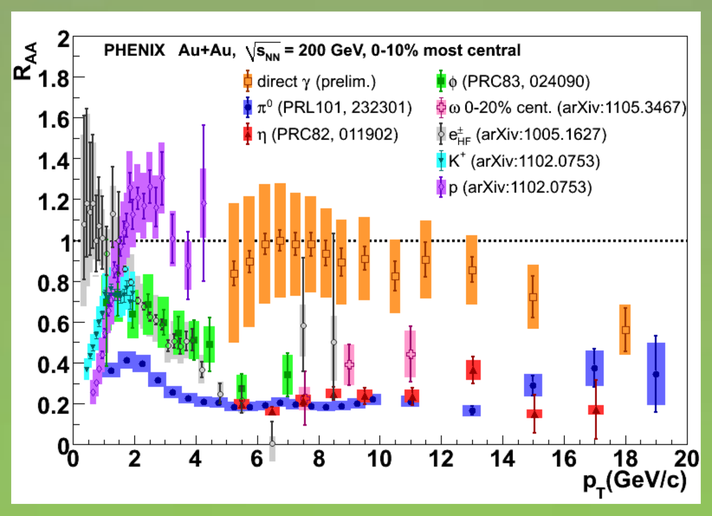
Cronin-effect – first seen long time ago – gave us many insights into the initial state of colliding nuclei

But *can we always tell the difference* – unambiguously?

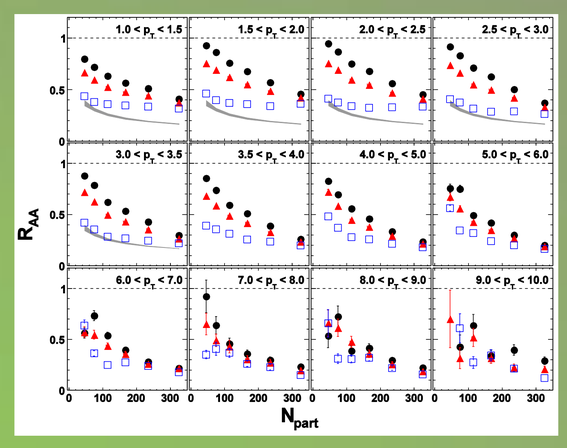
Suppression depends on average pathlength, which in turn depends on initial geometry

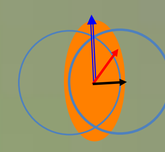
Flow depends on initial geometry, which in turn implies average pathlength

Cronin-effect (probably) doesn't care of any of those



But look at the azimuthal dependence of R_{AA}





And this is true everywhere:

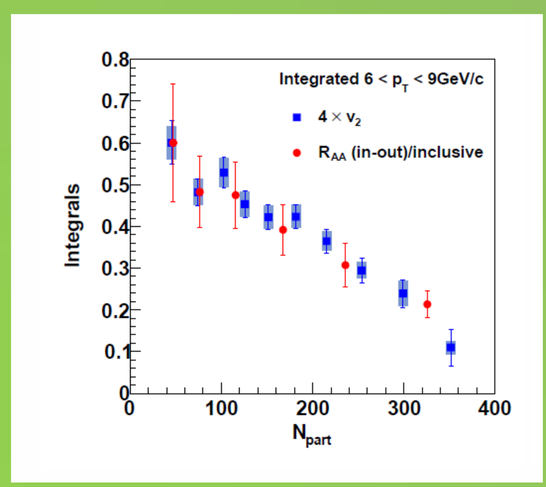
Suppression can be defined (mathematically) anywhere, it just doesn't make much physics sense at low p_T

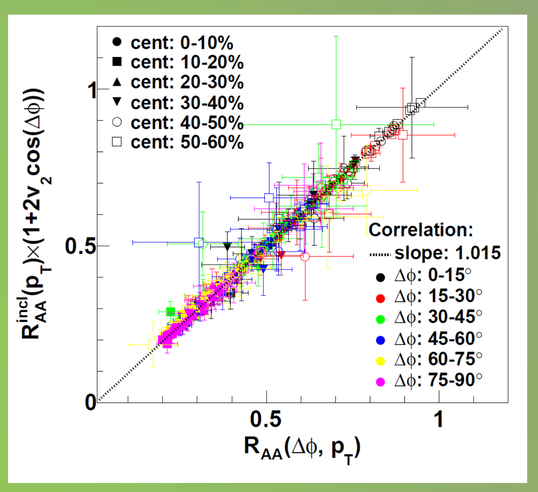
Flow can be defined (mathematically) anywhere, it just ?????? make much physics sense at high p_T

Does it or doesn't?

Well, look at the azimuthal dependence of R_{AA} where it makes most sense

$$\frac{R_{AA}(0,p_T) - R_{AA}(\pi/2,p_T)}{R^{incl}_{AA}(p_T)} \approx 4 \cdot v_2$$





Is there a jet-bias when determining the reaction plane?
If so, when does it matter?
And wherever it does matter,
how far should we go in η to get rid of it?

STAR, Hamed, 2011 J. Phys.: Conf Ser 270 012010

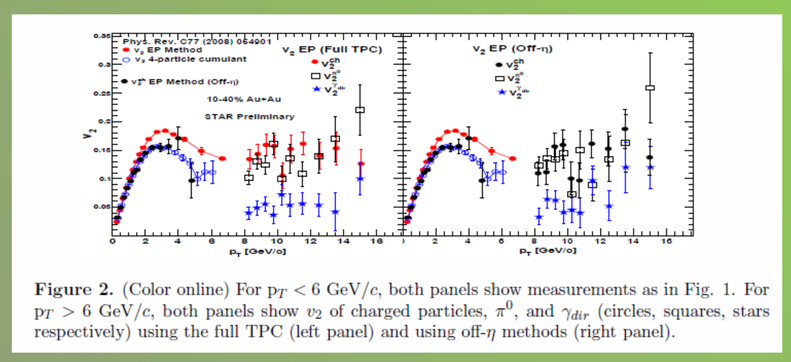
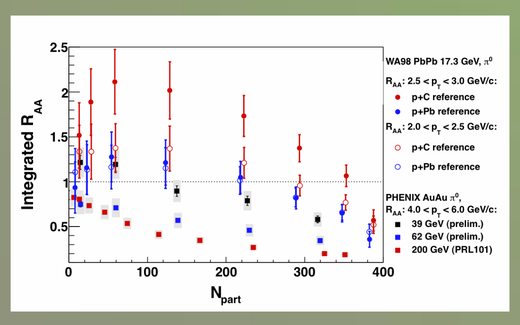


Figure 2. (Color online) For $p_T < 6$ GeV/c, both panels show measurements as in Fig. 1. For $p_T > 6$ GeV/c, both panels show v_2 of charged particles, π^0, and γ_{dir} (circles, squares, stars respectively) using the full TPC (left panel) and using off-η methods (right panel).

Where is the onset of suppression
(i.e. energy loss of hard scattered partons, i.e. deconfinement)?

Not exactly where R_{AA} goes below 1:
Cronin-effect will always be present
-- R_{AA}<1 only means that suppression is already stronger



Direct photons: the best probe so far to test RP bias because at high p_T they are essentially flowless ☺

STAR: Δη<2
PHENIX: Δη>1 and Δη>3

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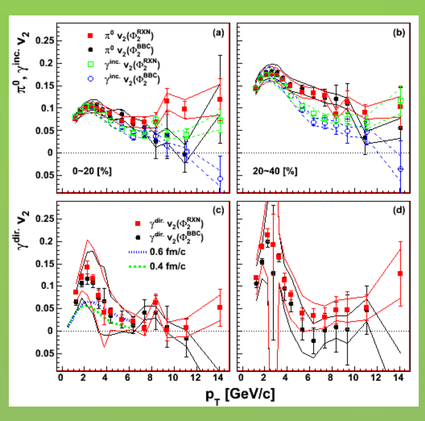

Once you go far enough in pseudorapidity
(and multiplicity is not too low!)
there is no high p_T photon flow within current sensitivity!

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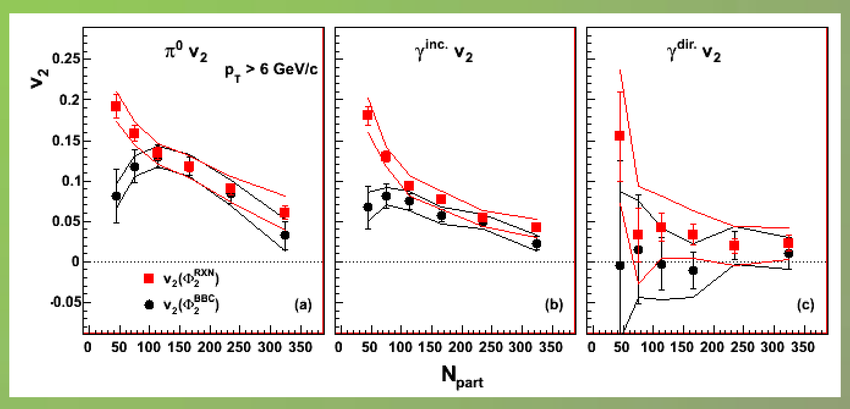

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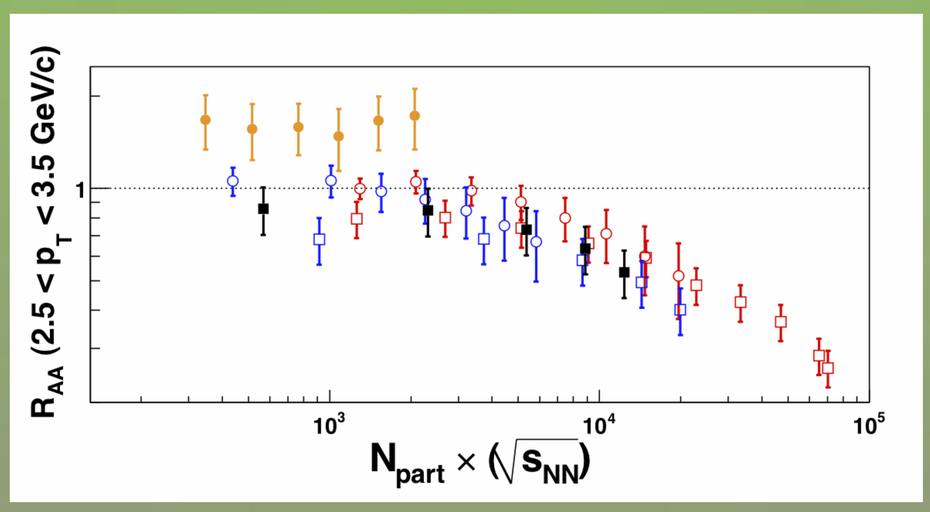

What does suppression depend on?

I don't know. Explanations are quite involved.
But here is something interesting:

Over a huge range of system sizes and collision energies
it appears to scale neatly with the total energy in the overlap volume!

Food for thought?

Note: LHC pp and SPS max. centrality are both around the middle of this plot!

Please go see related PHENIX talks by
Martin Purschke (Wed. 9:20)
Norbert Novitzky (Fri, 18:50)