

Theory group meeting

François Arleo

2 February 2023

Bienvenue !

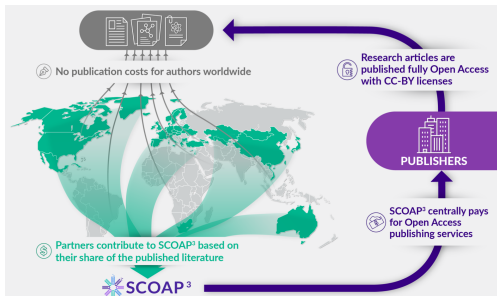
- Jakub Štěrba, a new PhD student in the group (6m/y)
 - ▶ co-tutelle with Czech Technical University in Prague (Boris Tomášik)
 - ▶ supervised by Marlene

- Hard Probes 2023: great success for the Theory Group. Congrats!
 - ▶ 1 plenary talk: Paul
 - ▶ 5 talks accepted: Alexander, Eamonn, Jacopo, Pol-Bernard, Tobie
 - ▶ 1 poster accepted: Mahbobeh
- QCD Master Class 2023 (5th edition!)
 - ▶ First circular to be sent shortly
- Conseil scientifique IN2P3 (6 Feb) dedicated to heavy ion physics
 - ▶ <https://indico.in2p3.fr/event/29225/>

Where to publish ? Go Open Access !

Interesting discussion during last réunion de chef d'équipes on renewing (or not) the lab subscription to PROLA (has been renewed)

- We are all encouraged to go towards Open Access (OA)
- What does OA mean ?
 - ✗ The author pays (a lot), the paper is published OA
 - ✓ The author does not pay, **SCOAP³** pays, paper is OA → full open access



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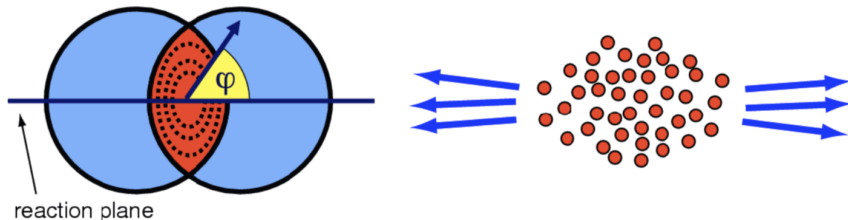
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- Which journals are fully OA ?
 - ▶ **EPJ C, JHEP, Nucl. Phys. B, Phys. Lett. B**
- Interesting workshop on this topic held at CERN last October 2022
 - ▶ <https://indico.cern.ch/event/1179488/>
- Unlike big experiments, we are free to submit where we want :-)

Miscellaneous

- Khalil asks about our needs for disk storage
 - ▶ Plans for the next 2 years
 - ▶ Please clean `/scratch/theoric` and `/scratch/theoric2`
- Any other business?

Elliptic flow

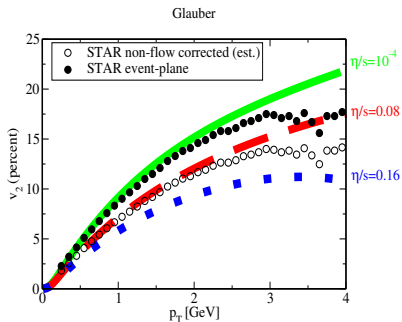
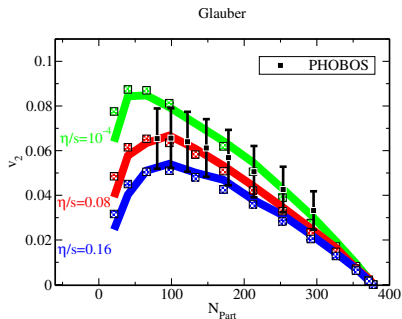
Consider **non-central** collisions: overlap region has an **almond shape**



Collectivity transforms spatial anisotropies into **momentum anisotropies**

- Strong pressure gradient in the reaction place
- Weaker pressure at $\varphi = \pm \pi/2$
- Anisotropies measured by **Fourier coefficients** $v_n = \langle \cos(n\varphi) \rangle$

Elliptic flow at RHIC/LHC



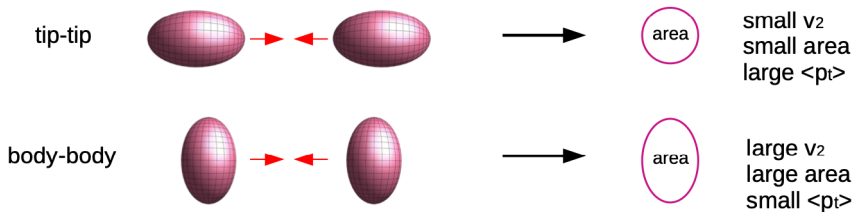
- Strong flow measured at RHIC & LHC
- Data best described with hydro, with small viscosity: $\eta/s = 0.2 \pm 0.1$
- Challenging extraction of η/s from data

Towards a new method to image nuclei

Particle anisotropy reflects the spatial distribution of incoming nucleons

- Flow harmonics different in spherical and deformed nuclei

Giacalone Ollitrault 2021



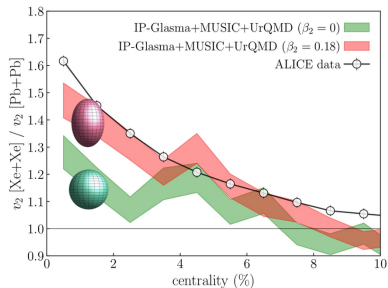
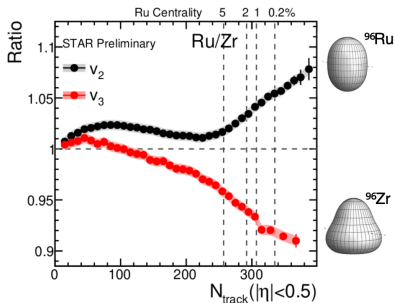
- Can be tested using different nuclei at FAIR/RHIC/LHC
 - Ru, Zr, Cu (RHIC), Xe, Pb, Ar, Kr, In, Ca... (LHC)

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👉 Has now become a very active field

👉 Link between high-energy heavy ion collisions and nuclear physics

An interesting topic to discuss ?

- In our group, **expertise and interests** in
 - ▶ heavy ion collisions & hydrodynamics
 - ▶ Shapes of nuclei from low energy nuclear physics
 - ▶ Could be fun to investigate, out of curiosity
- Further reading
 - ▶ Review article <https://arxiv.org/abs/2209.11042>
- Current INT workshop
 - ▶ <https://www.int.washington.edu/programs-and-workshops/23-1a>