

25th November 2021

Terzo incontro di fisica con ioni pesanti alle alte energie



Global properties from pp to AA Hydrodynamics and collectivity

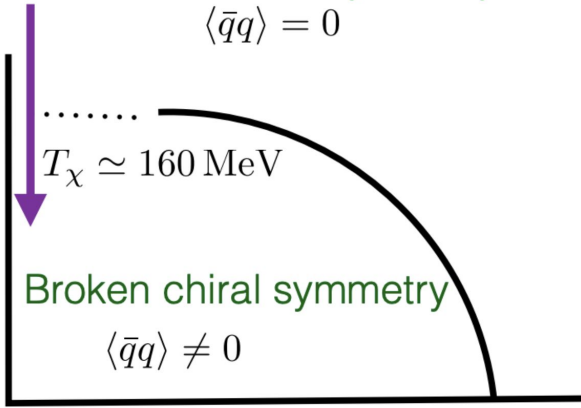


New developments on hydro models

QGP with chiral symmetry

$$\langle \bar{q}q \rangle = 0$$

T



Broken chiral symmetry

$$\langle \bar{q}q \rangle \neq 0$$

μ

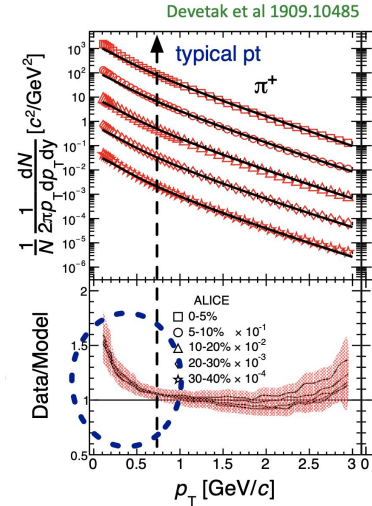
We are neglecting any dynamics of the chiral condensate !
The pions are the goldstone boson of the spontaneous symmetry break

Effective Boltzmann equation for soft pions

From the linear propagator we can define (using the Wigner transform) and effective kinetic description of the soft pions distribution function

$$\partial_t f_\pi + \frac{\partial E_{\mathbf{p}}}{\partial \mathbf{q}} \frac{\partial f_\pi}{\partial \mathbf{x}} - \frac{\partial E_{\mathbf{p}}}{\partial \mathbf{x}} \frac{\partial f_\pi}{\partial \mathbf{q}} = \text{dumping term}$$

[link to talk](#)



- Naturally the pion propagation in the medium are modified such for low p_T



From small to large systems: how to constrain models?

[link to talk](#)

Results in small and large colliding systems at the LHC are showing that particle production mechanisms are similar

→ several observations might be described at the same time by hydro and microscopic models or by a mixture of both



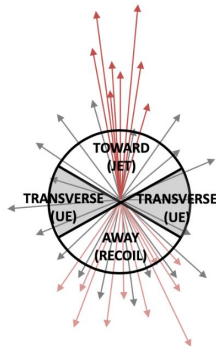
Event topology might be a way to go to constrain models, is there anything else?

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Topological classification of pp events, identifying:

- Toward region (triggering jet) + Away region (recoiling jet)
- Transverse region (Underlying Event - UE)

The jet direction is the direction of the highest- p_T hadron ($p_T^{\text{leading}} > X \text{ GeV}/c$)



And then one can:

- Select “isotropic” and “pencil-like events” (Sphericity)
- Measure spectra in “toward”, “transverse”, “away” (in-/out-of-jet)
- Express enhancement wrt UE multiplicity (R_T)

