**BACKGROUND**

Active experimental analysis of fluctuation observables, especially their non-Gaussianity.

**Q₀** Are these fluctuations the equilibrium one generated at some time during time evolution?

**A₀** NO! Fluctuations continue to change until the medium arrives at the detector.

Experimental results should be interpreted taking the non-equilibrium effects into account.

**Q₁** How to describe the non-eq. diffusive process of non-Gaussian cumulants?

**Q₂** How to verify this picture experimentally?

**A₁: MODEL**

Diffusion master equation (Brownian particles' model)

\[
\frac{\partial}{\partial t} P(n) = \gamma \sum_x \left[ (n_x + 1) \left( P(n + e_x - e_{x+1}) + P(n + e_x - e_{x-1}) \right) - 2n_x P(n) \right]
\]

**NOTE:** This model can describe the approach of non-Gaussian fluctuations toward the equilibrated hadronic value.

× Langevin-type eqs. → Non-Gaussianity vanishes in equil.

**A₂: CONCLUSION**

Measure the rapidity-window dependences of various cumulants in experiments! → transport and thermodynamic properties

Do NOT compare experimental results directly with theory assuming equilibrium! → Take \( \Delta \eta \) large limit for comparison!

**RESULT**

Rapidity window dep. of 4th-order cumulant in the final state for various initial conditions

- Cumulant at a \( \Delta \eta \) differs from their initial values.
- Experiments can distinguish different lines in the Fig.