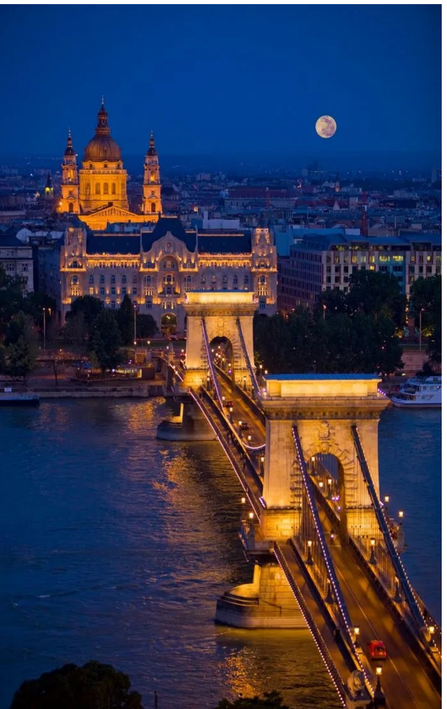
Warsaw University of Technology
Faculty of Physics

Like-sign pion femtoscopy in AgAg beam 1.58A GeV in HADES experiment

Anna Kodym



ZIMÁNYI SCHOOL 2025

I. Csók: Lightning over Balaton

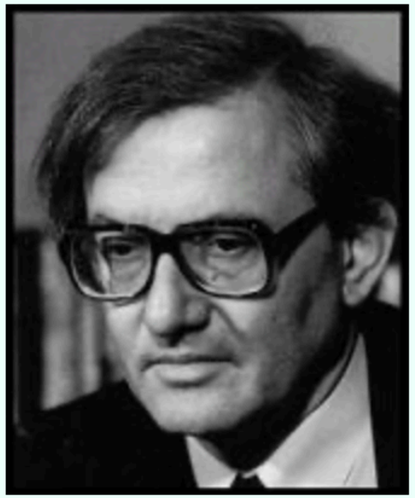
25th ZIMÁNYI SCHOOL

WINTER WORKSHOP

ON HEAVY ION PHYSICS

December 1-5, 2025

Budapest, Hungary



József Zimányi (1931 - 2006)

Femtoscopy

Allows us to measure very small and short live fireballs that exist during heavy-ion collision

Assumed from quantum mechanics and final state interactions, here mostly **Coulomb force** as strong interaction is negligible

Measured in experiment

$$C(q,r) = \int S(r)\,|\psi(q,r)|^2\,d^3r = \frac{Sgnl(q)}{Bckg(q)}$$

Koonin-Pratt equation

Determined - effect of analysis

Our data:

- **Energy**: $\sqrt{s_{NN}}$ = 2.55 GeV (1.58 AGeV)
- **System**: Ag + Ag collision

Sgnl(q) → Pairs from same event

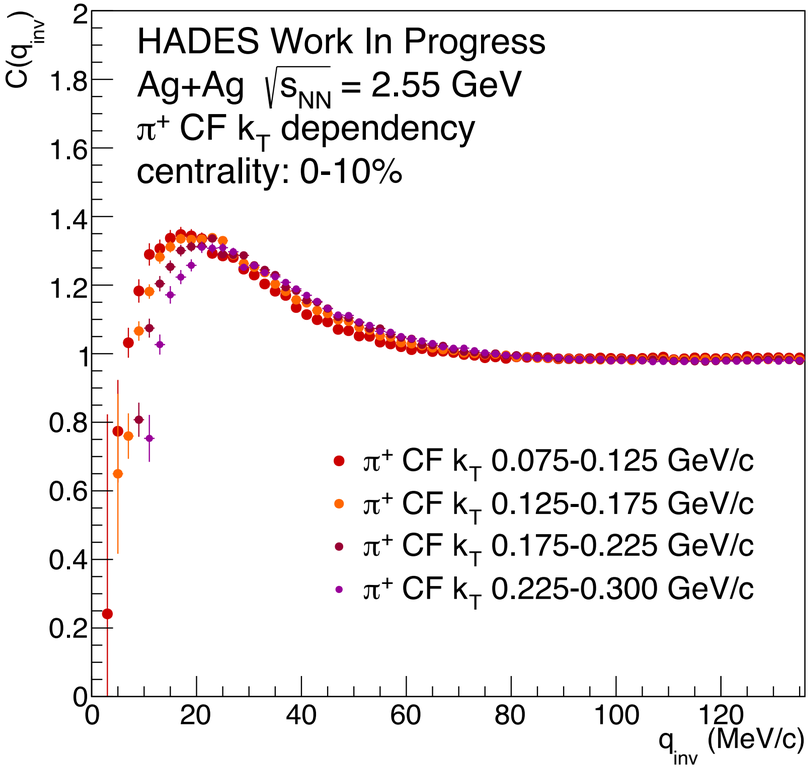
Bckg(q) → Pairs from different but similar events

Analysis metod:

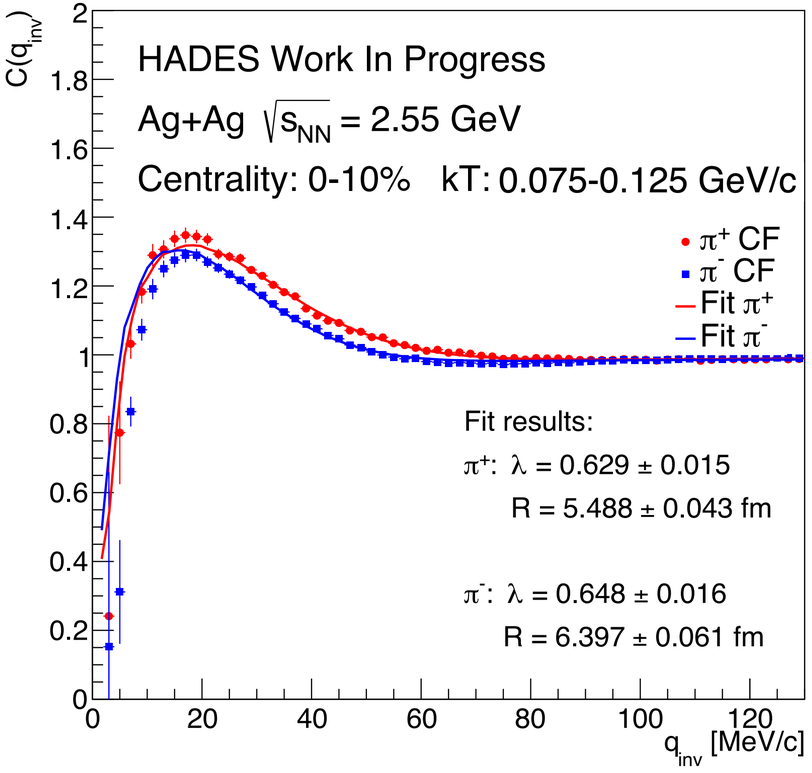
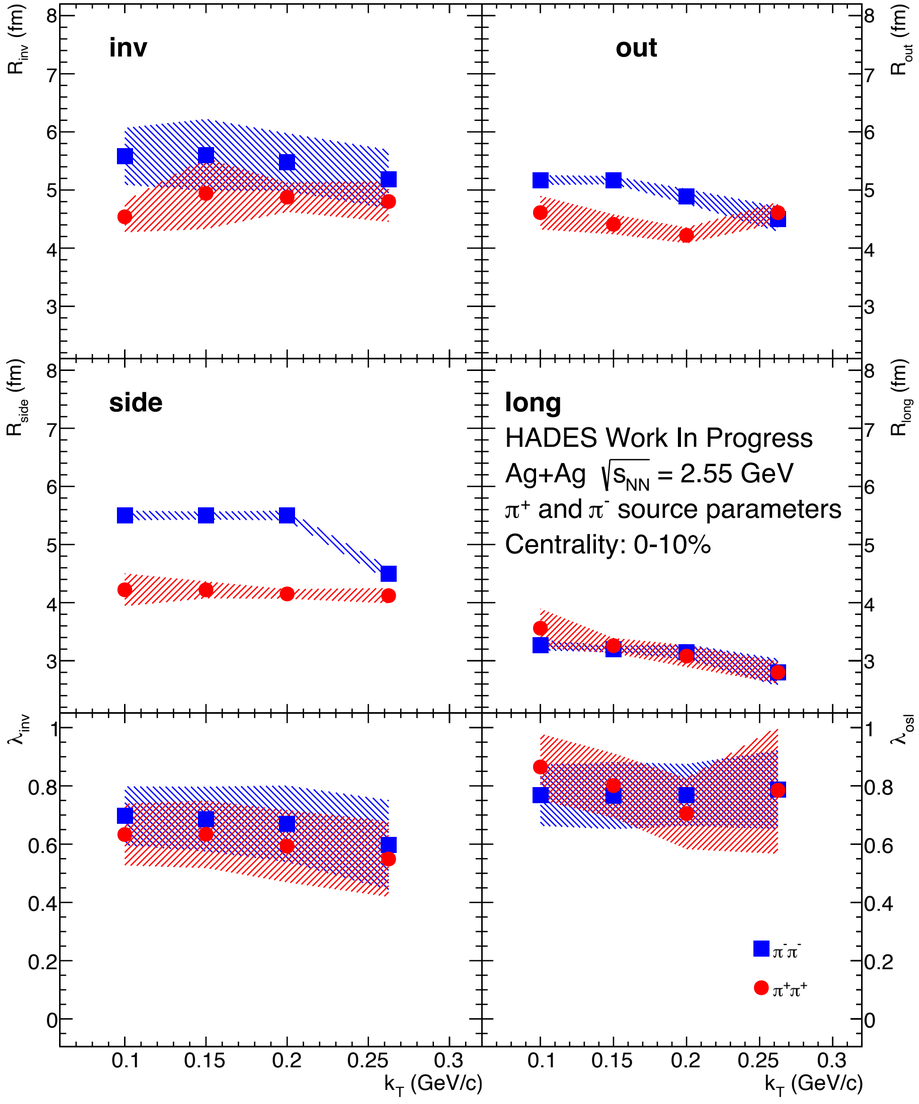
- **1D** analysis: q_{inv}
- **3D** analysis: q_{out}, q_{side}, q_{long}
- **Bowler-Sinyukov** function fitting

Results

Transverse momentum dependency in centrality classes



Bowler-Sinyukov correction function fitted to 1D and 3D case



Source parametrization for 1D and 3D for $\pi^+\pi^+$ and $\pi^-\pi^-$ functions