



13th Collaboration Meeting of the BM@N Experiment at NICA



V.I.Veksler and A.M.Baldin Laboratory of High Energy Physics, JINR, October 08 – 10, 2024

Baryon femtoscopy (status)

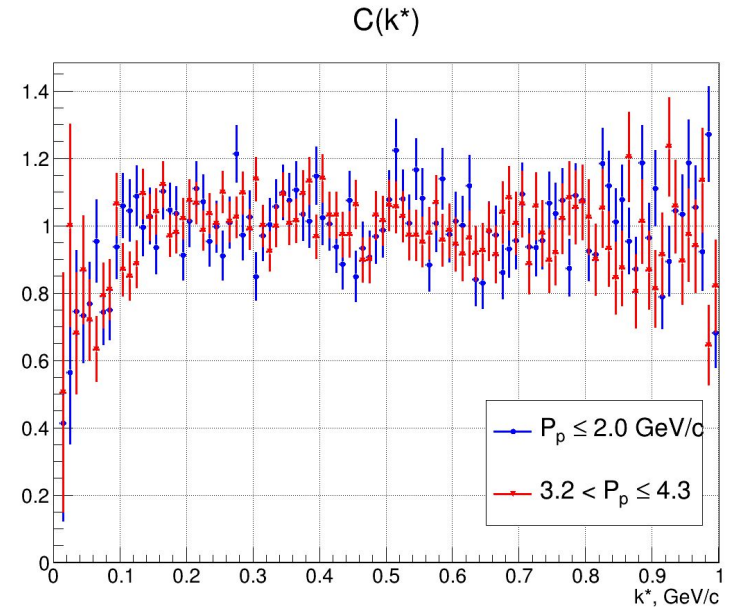
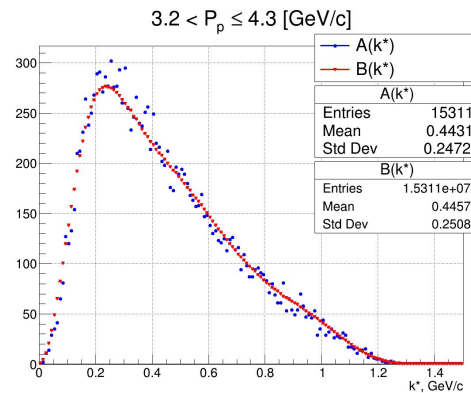
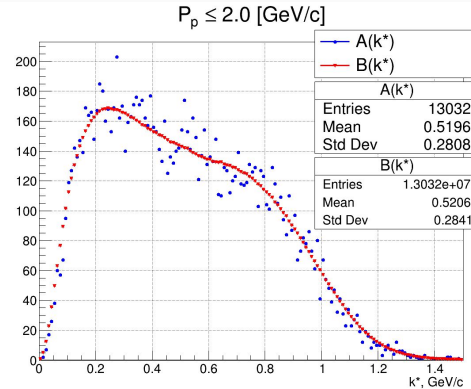
P. Alekseev, L. Kovachev, R. Lednicky, D. Peresunko, V. Plotnikov,
N. Pukhaeva, A. Stavinsky
for BM@N collaboration

Correlation function for different proton momentum ranges (experimental data)

Correlation function:

$$C(k^*) = \frac{A(k^*)}{B(k^*)}$$

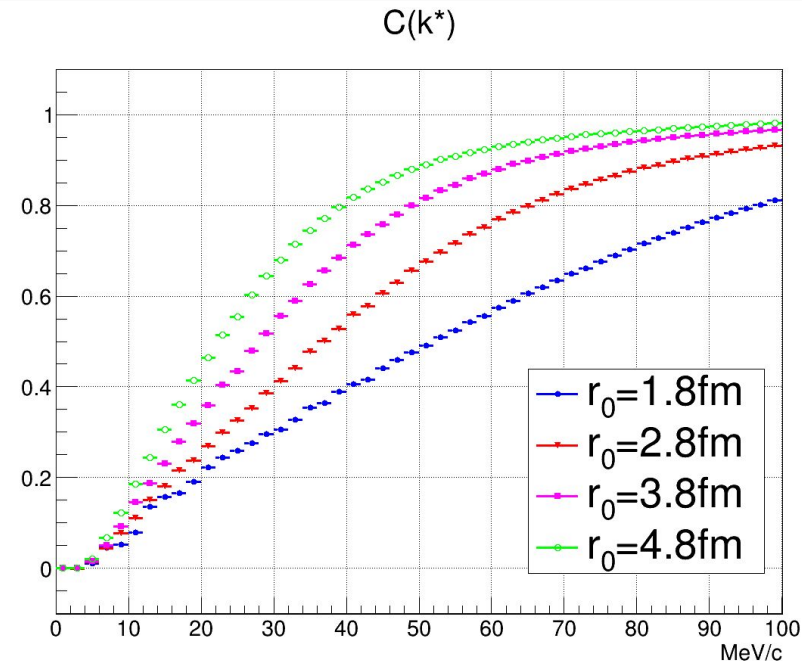
$$k^* = \frac{1}{2} \cdot |\vec{p}_1^* - \vec{p}_2^*|$$



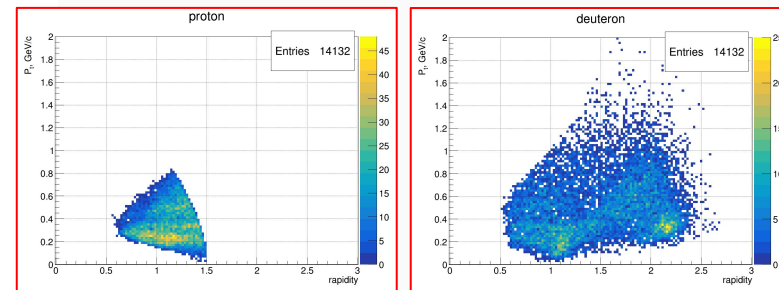
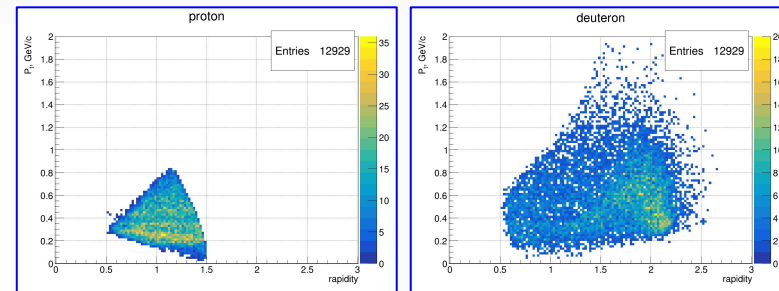
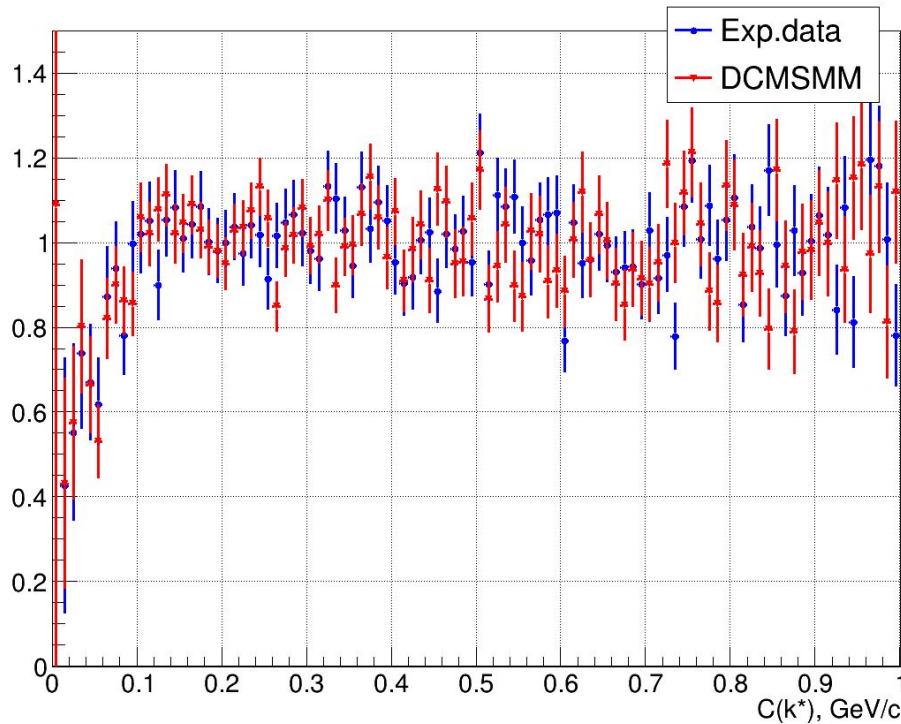
Calculated FSI correlation function:

The FSI calculation assumes:

- a Gaussian r-distribution $\sim \exp(-\frac{r^2}{4r_0^2})$
where $r^2 = (\vec{r})^2, \vec{r} = \vec{r}_1 - \vec{r}_2$
- short-range FSI dominated by s-wave
- approximate account of the inner region of the short-range FSI potential (valid if r_0 is larger than the effective potential radius)



Ar 3.2AGeV beam \rightarrow C,Al,Cu,Sn,Pb target

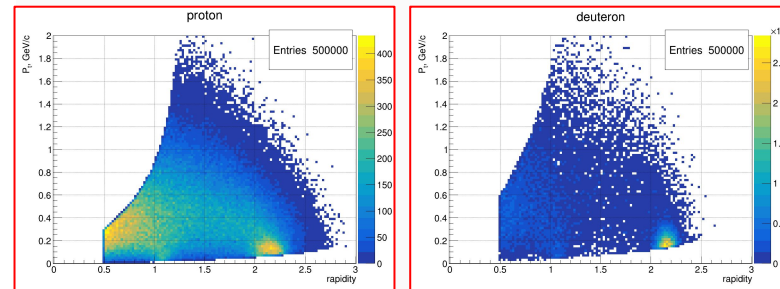
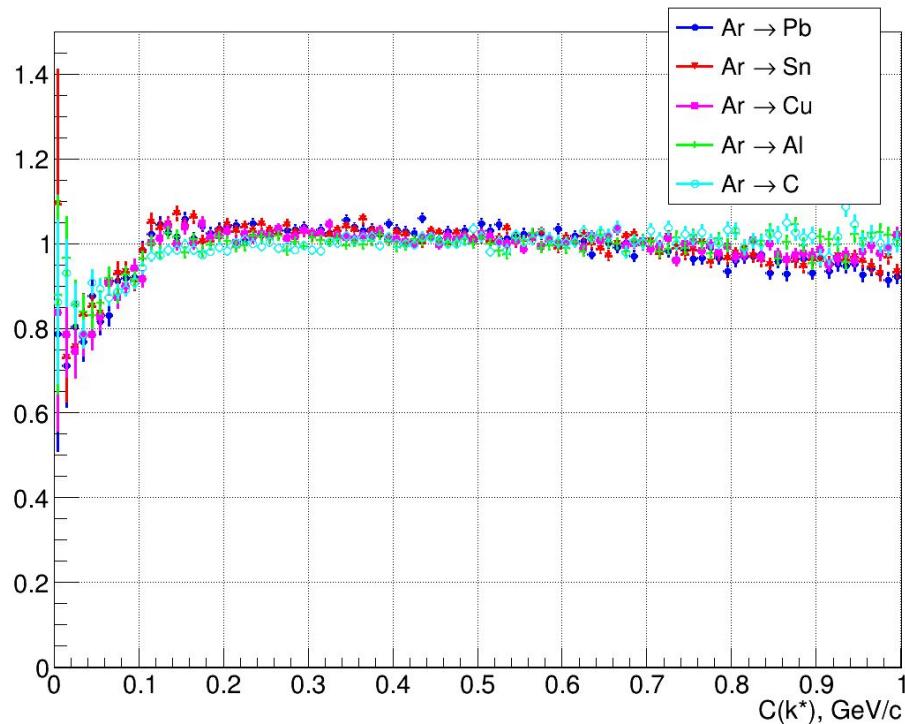


Proton momentum is less than 2 AGeV

Selecting events for mixing:

- Same target
- Equal number of protons & deuterons

DCMSMM Ar 3.2AGeV

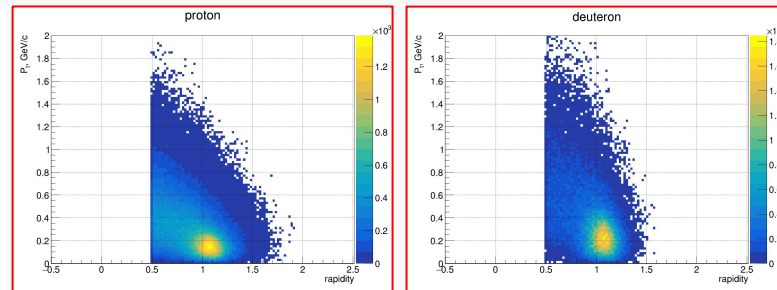
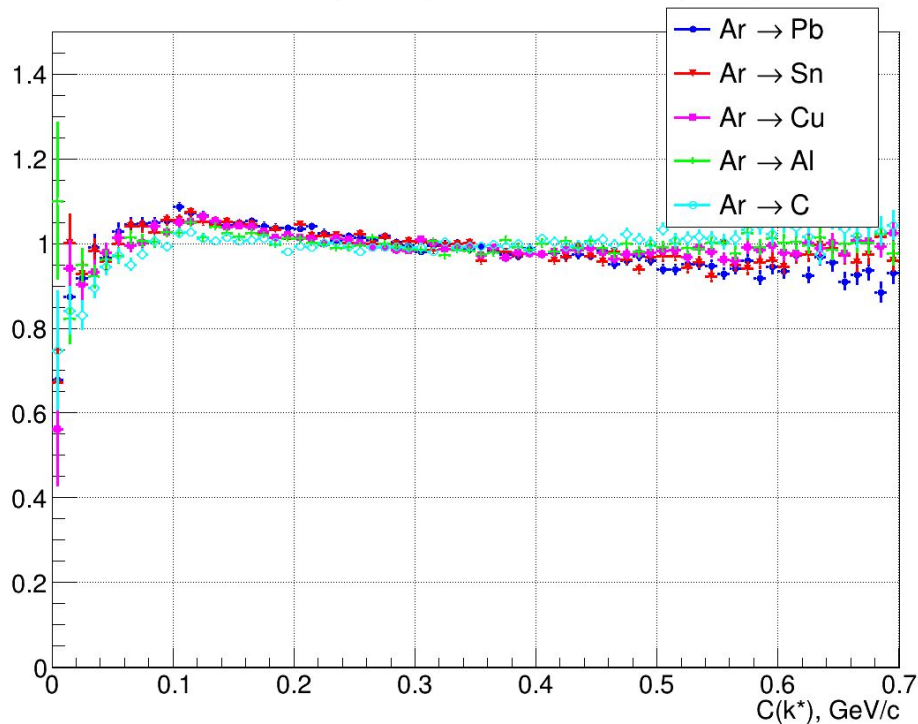


Rapidity ≥ 0.5 $1^\circ \leq \Theta \leq 30^\circ$

Selecting events for mixing:

- Same target
- Equal number of protons & deuterons

PHQMD(CMS) - Ar 3.2AGeV(Lab)



Rapidity ≥ 0.5

Selecting events for mixing:

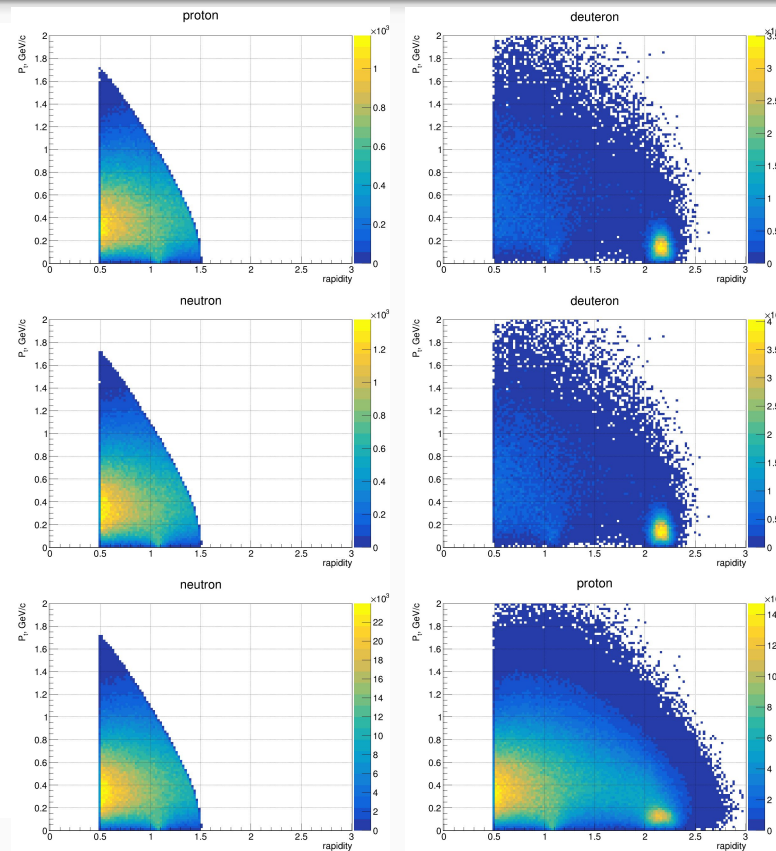
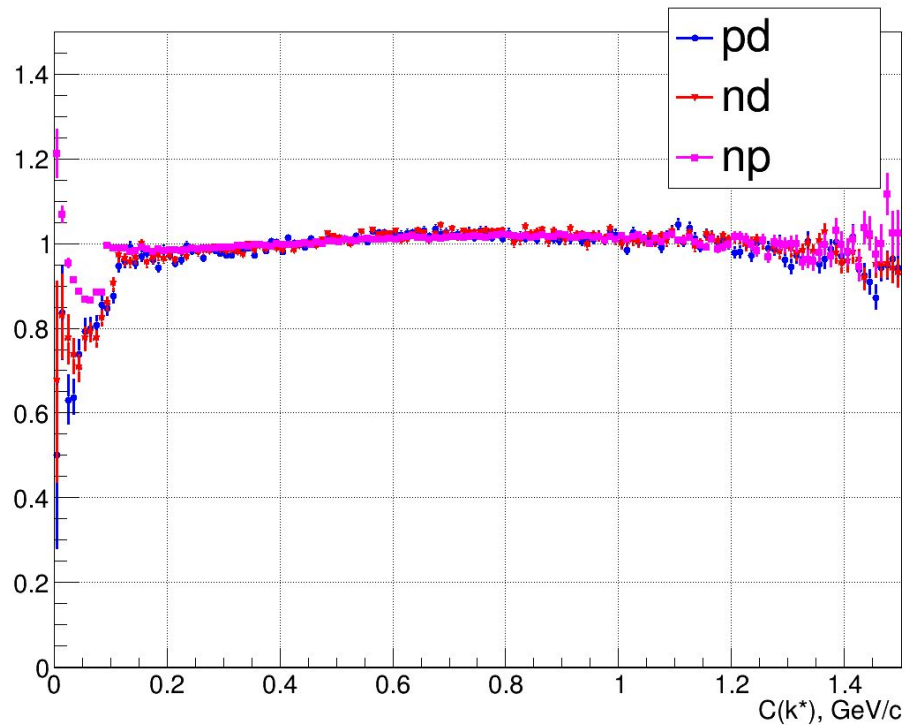
- Same target
- Equal number of protons & deuterons

Next steps:

- Analysis:
 - Finishing p-d on BM@N run 7 using full set of experimental data and appropriate Monte-Carlo statistic
 - Continue p-d on BM@N run 8 data
 - Go to p-p and other particles species
- Possible solutions:
 - 1. Apply additional weight func to the generator data to make $C(k^*)$ uniform
 - 2. Use random generated particles. Pass them throw the detector to consider the acceptance, resolution and efficiency

Thank you for attention!

DCMSMM ArSn 3.2AGeV



Random momentum

