62nd meeting of the PAC for Particle Physics
Study of Λ hyperons directed flow in Xe+Cs(I) collisions at E_{kin}=3.8 AGeV with BM@N experiment

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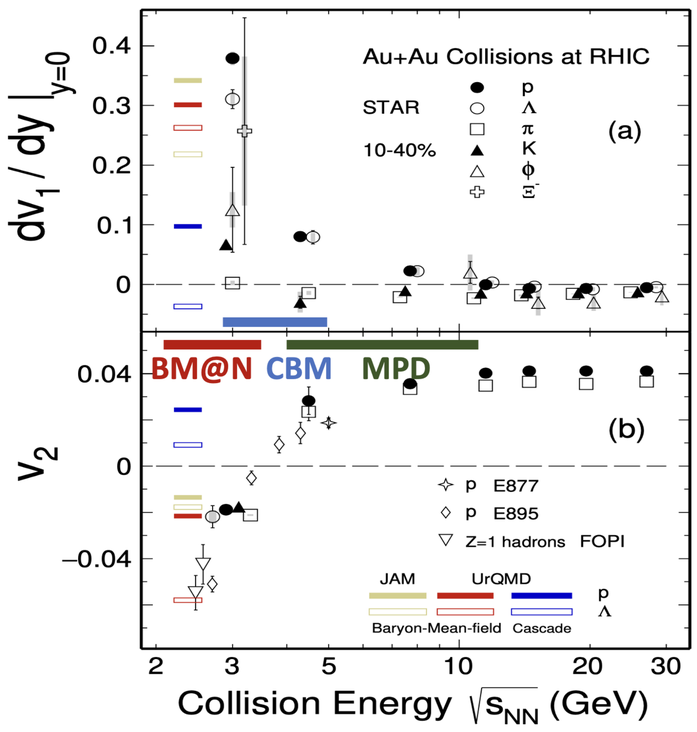
v_1 at Nuclotron-NICA energies



$$\frac{dN}{d\varphi} \approx 1 + 2\sum_{n=1} v_n \cos\left[n\left(\varphi - \Psi_{\mathrm{RP}}\right)\right]$$

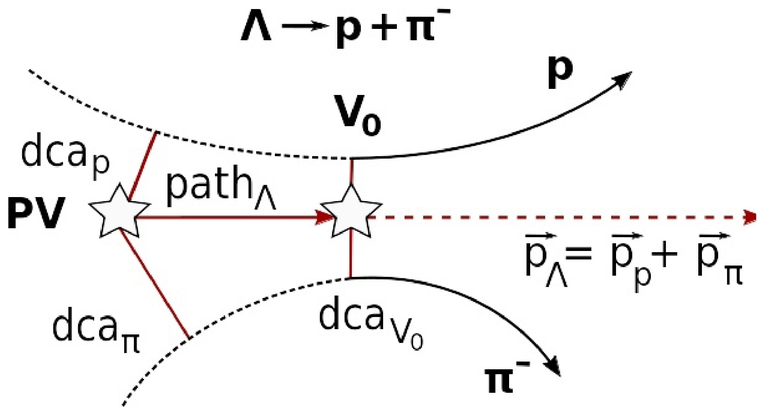
Anisotropic flow v_n at Nuclotron-NICA energies is a delicate balance between:

- The ability of pressure developed early in the reaction zone
  $(t_{\mathrm{exp}} = \frac{R}{c_s},\ c_s = \sqrt{\frac{dp}{d\varepsilon}})$
- The passage time for removal of the shadowing by spectators
  $(t_{\mathrm{pass}} = \frac{2R}{\gamma_{\mathrm{CM}}\beta_{\mathrm{CM}}})$

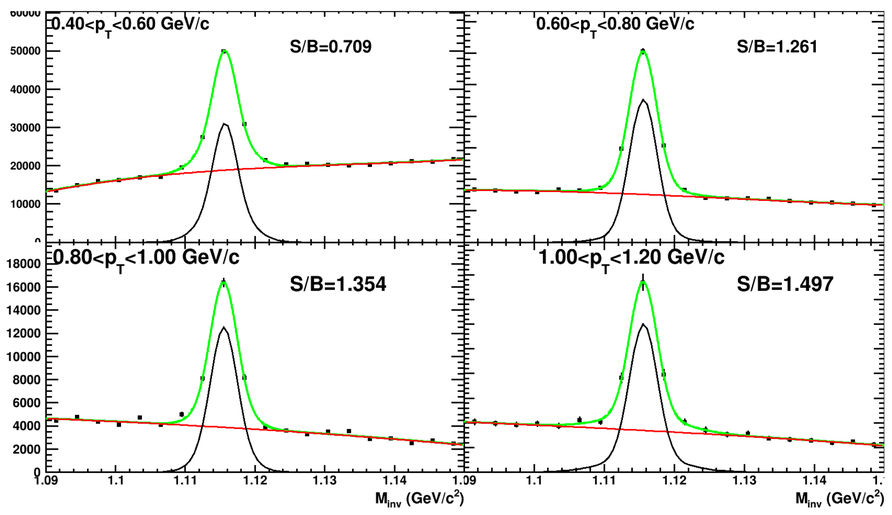
Study the anisotropic of Λ will provide information about:

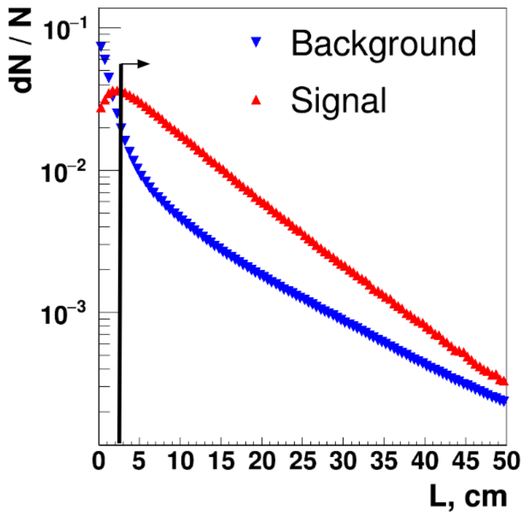
- **Early stage of the evolution of colliding nuclei**
- **Hyperon-nucleus interactions**
- **Strong repulsive Λ potential**

Λ reconstruction

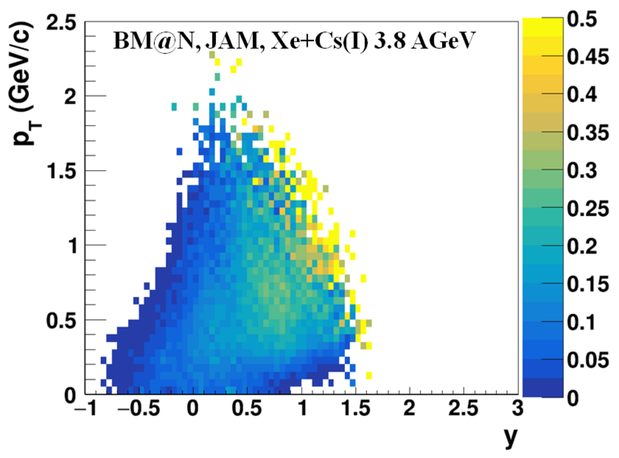


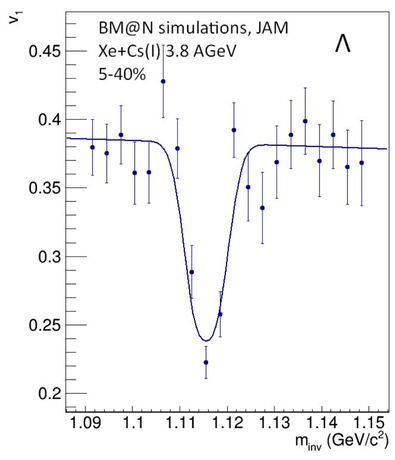
Selection of daughters (p, π) by charge
Reconstruction of Λ candidates and its topological selection with KFParticle
Event plane resolution is obtained from FHCal
Fit inv mass distribution of candidates and v_1 in $p_T - y$ bins.

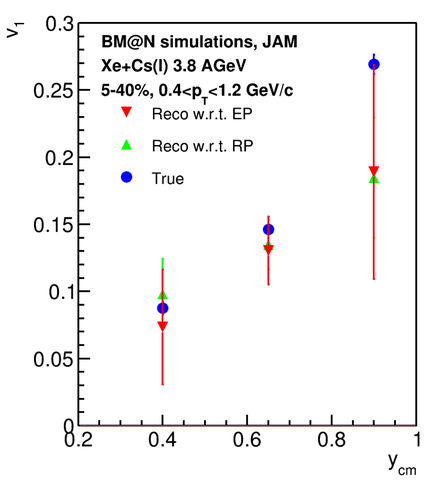




Performance study with JAM model

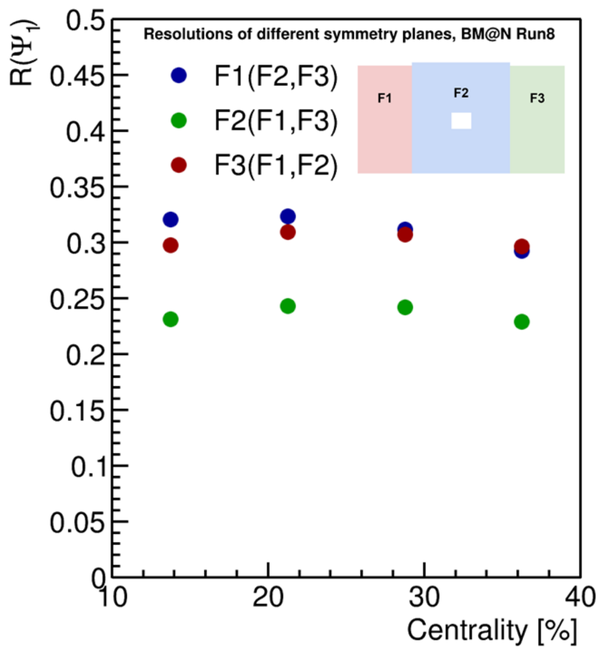


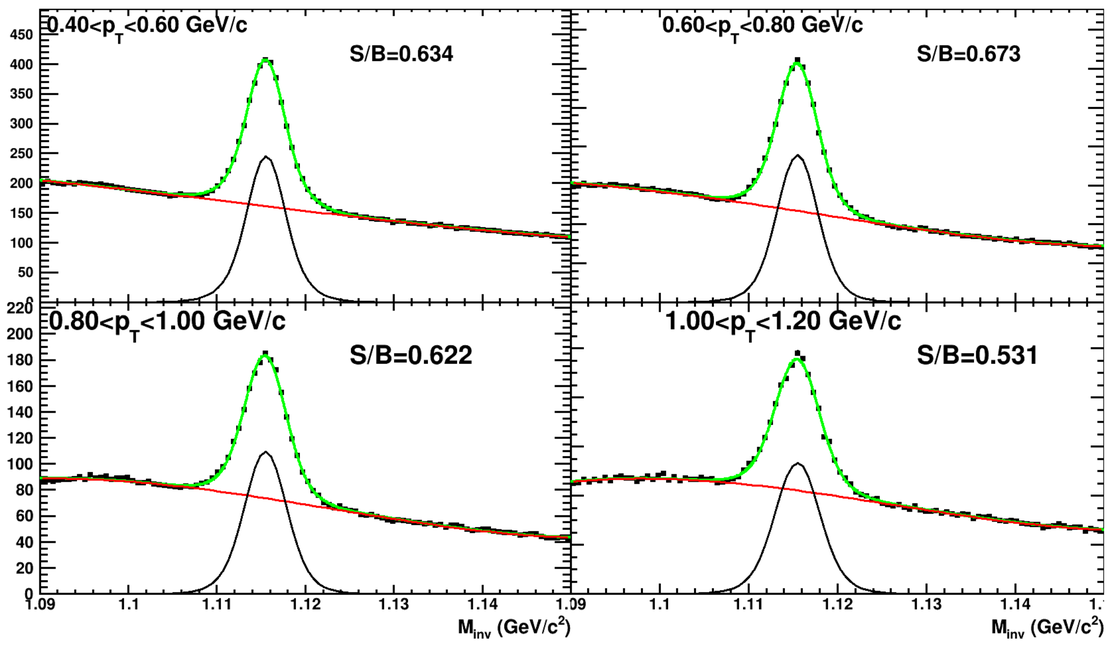


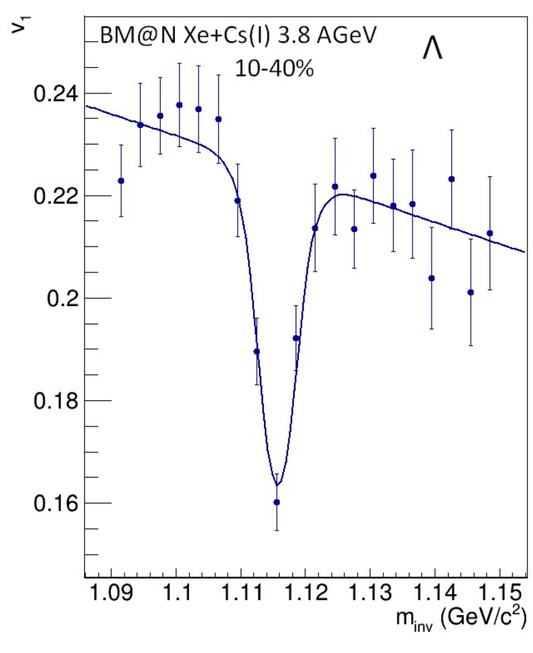


Very limited acceptance of Λ hyperons - analysis can be provided only for $p_T < 1.2$ GeV/c.
Rather good fit of v_1 peak at inv mass distribution. Comparison of Monte-Carlo signal and reconstruction shows an agreement within the statistical errors.
The effect of uncertainties of event plane reconstruction has a minor impact.

First results with experimental data







Event plane resolution(left), inv mass distribution in p_T bins(central) and v_1 as a function of inv mass(right). Very good fit performance for each range of transverse momentum. Using the obtained signal and background functions, directed flow as a function of invariant mass was fitted.

Conclusions

- Performance study of directed flow measurements for Λ hyperons and first results with experimental data for BM@N Xe+Cs(I) E_{kin}=3.8 AGeV.
- An agreement between reconstructed results and Monte-Carlo signal.
- KFParticle reconstruction and invariant mass fitting procedures work well with BM@N experimental data.