

Production of ϕ -meson in dAu @ BES

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Motivation:

- 1) Study of cold nuclear effect on ϕ -meson production at BES energies
- 2) dAu can be used as base-line for nuclear modification and strangeness enhancement study at BES energies.

Data Sets

Collision System : d+Au

Centre of Mass Energy : 20, 39 and 62 GeV

Production : P17id

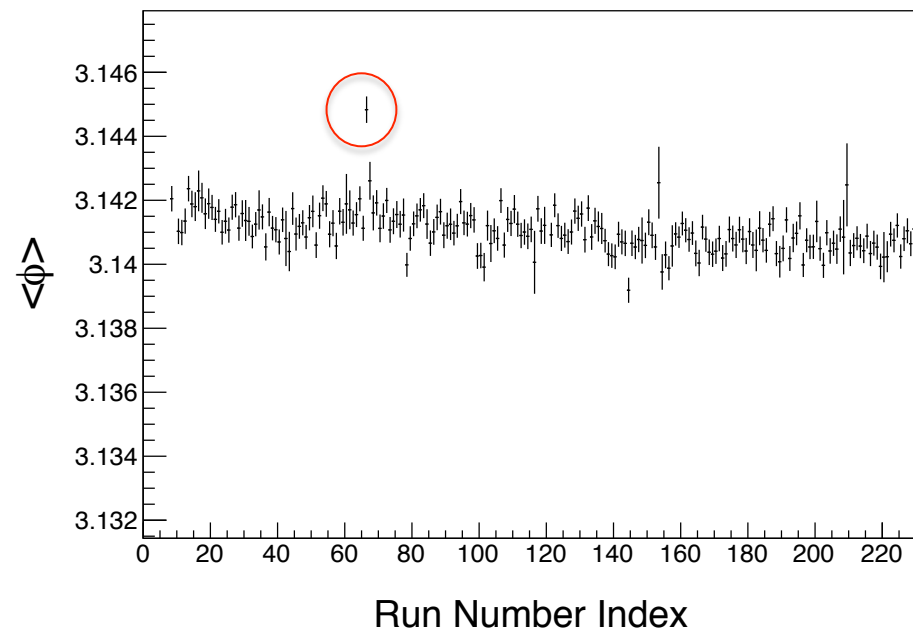
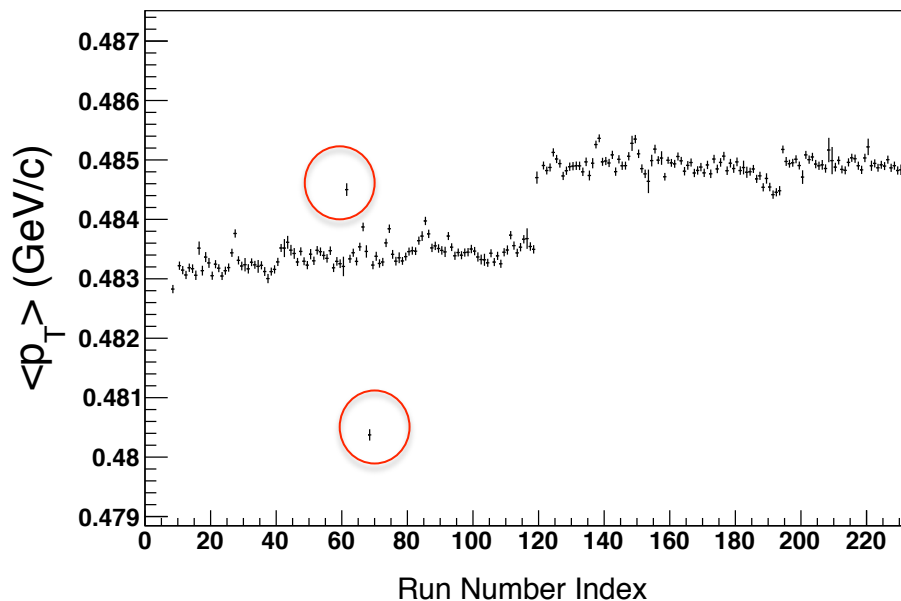
Trigger :

20 GeV : 550001, 550003, 550007, 550011, 550856, 550854, 550851, 550852

39 GeV : 560000, 560001, 560007, 560011, 560853, 560858, 560868, 560854

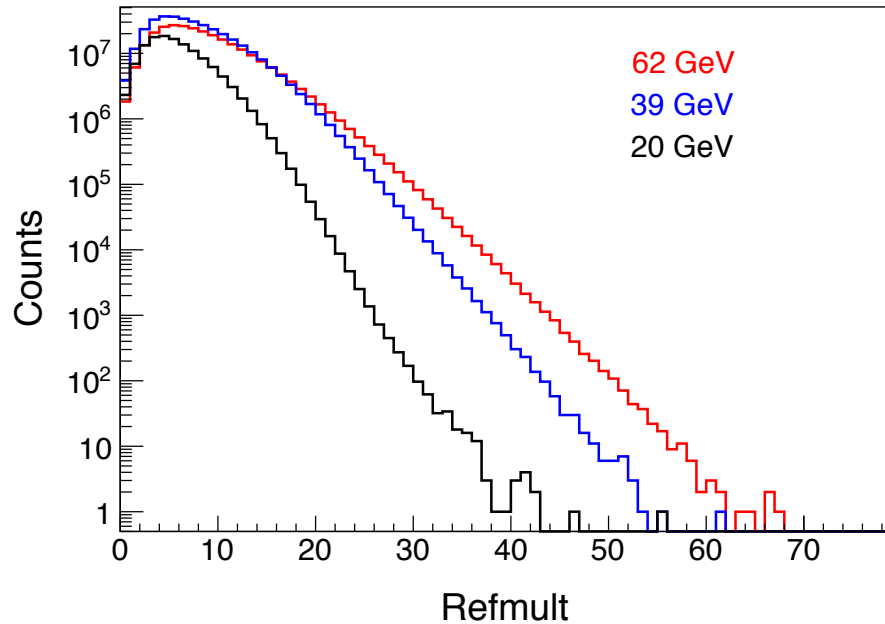
62 GeV : 540003, 540000, 540002, 540852, 540863, 560858

Good Run QA



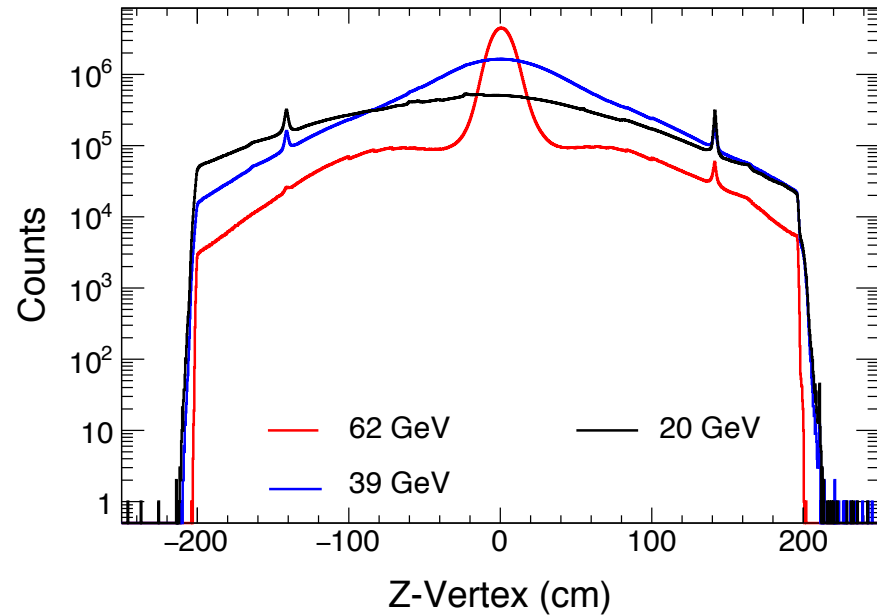
- Bad runs based on preliminary QA (e.g $\langle p_T \rangle$ vs Run number) are rejected from this analysis.

Event QA



Event Selection Cuts:

- $|V_z| < 50$ cm
- $V_r < 2$ cm

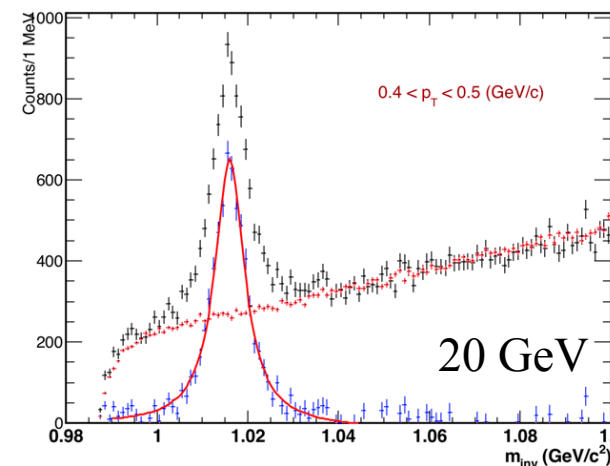
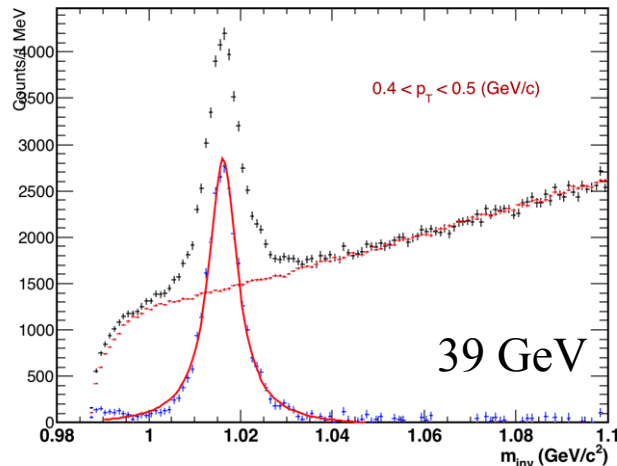
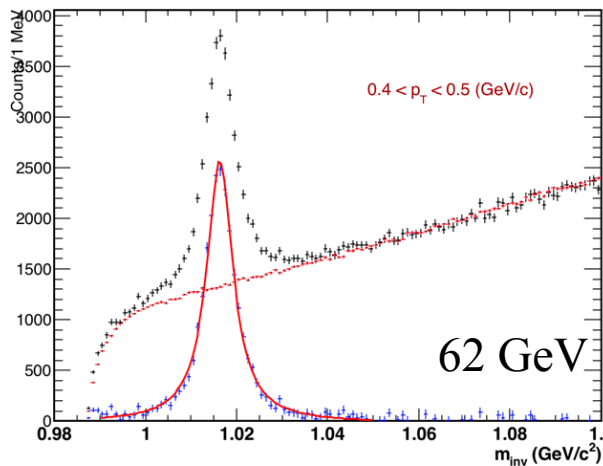


Vertex Selection:

$$|v_z V_{pd} - V_z| < 8$$

Number of Event after Vertex cut : 270 M (62 GeV), 350 M (39 GeV), 125 M (20 GeV)

ϕ -meson reconstruction



Decay Channel: $\phi \rightarrow K^+ + K^-$ (Branching ratio : 0.49)

Kaon Identification: TPC ($|\text{nsigmaK}| < 2$) + TOF (only if $\text{Beta} > 0$)

Combinatorial background is estimated using Mixed Event Technique

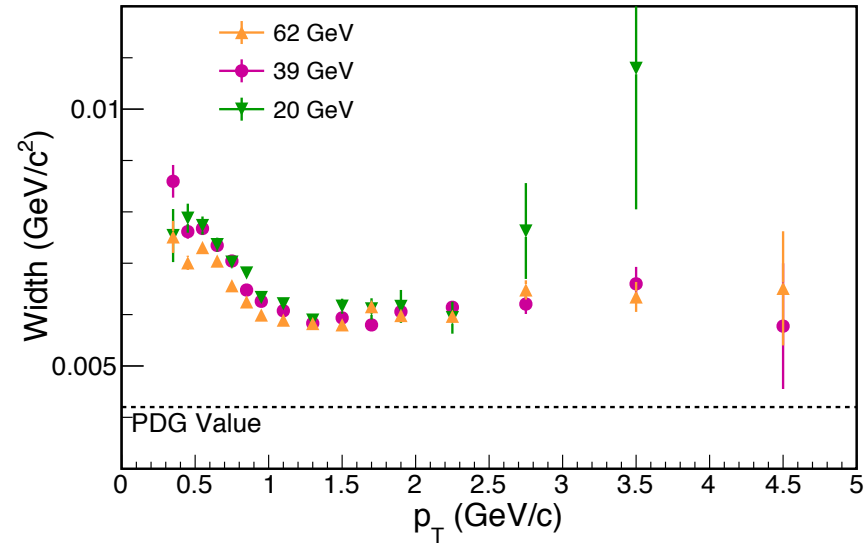
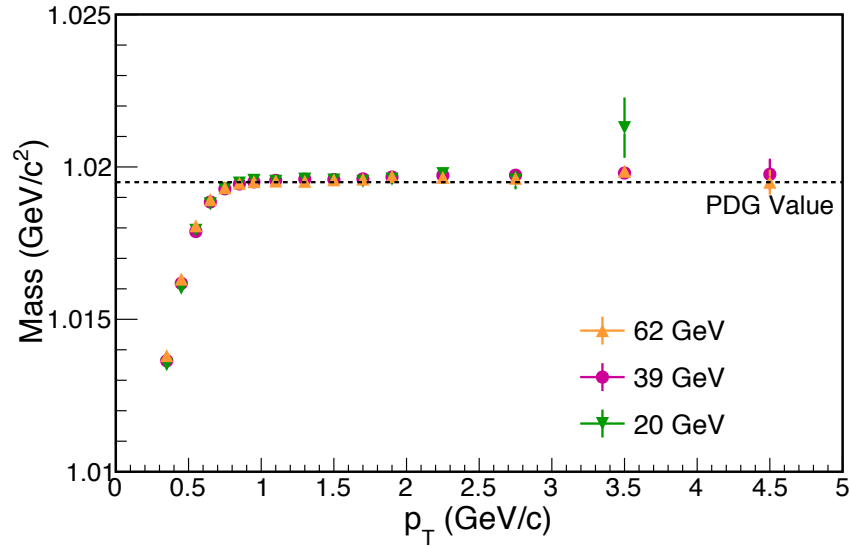
ϕ -meson signal is fitted using Breit-Wigner (B.W) function to calculate yield, mass and width.

$$B.W = \frac{1}{2\pi} \frac{A \times \Gamma}{\{(m_{inv} - m_{phi})^2 + (\Gamma/2)^2\}}$$

[Plots for other \$p_T\$ bins:](http://www.star.bnl.gov/protected/bulkcorr/nasim/dAu/)

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Reconstructed Mass and Width



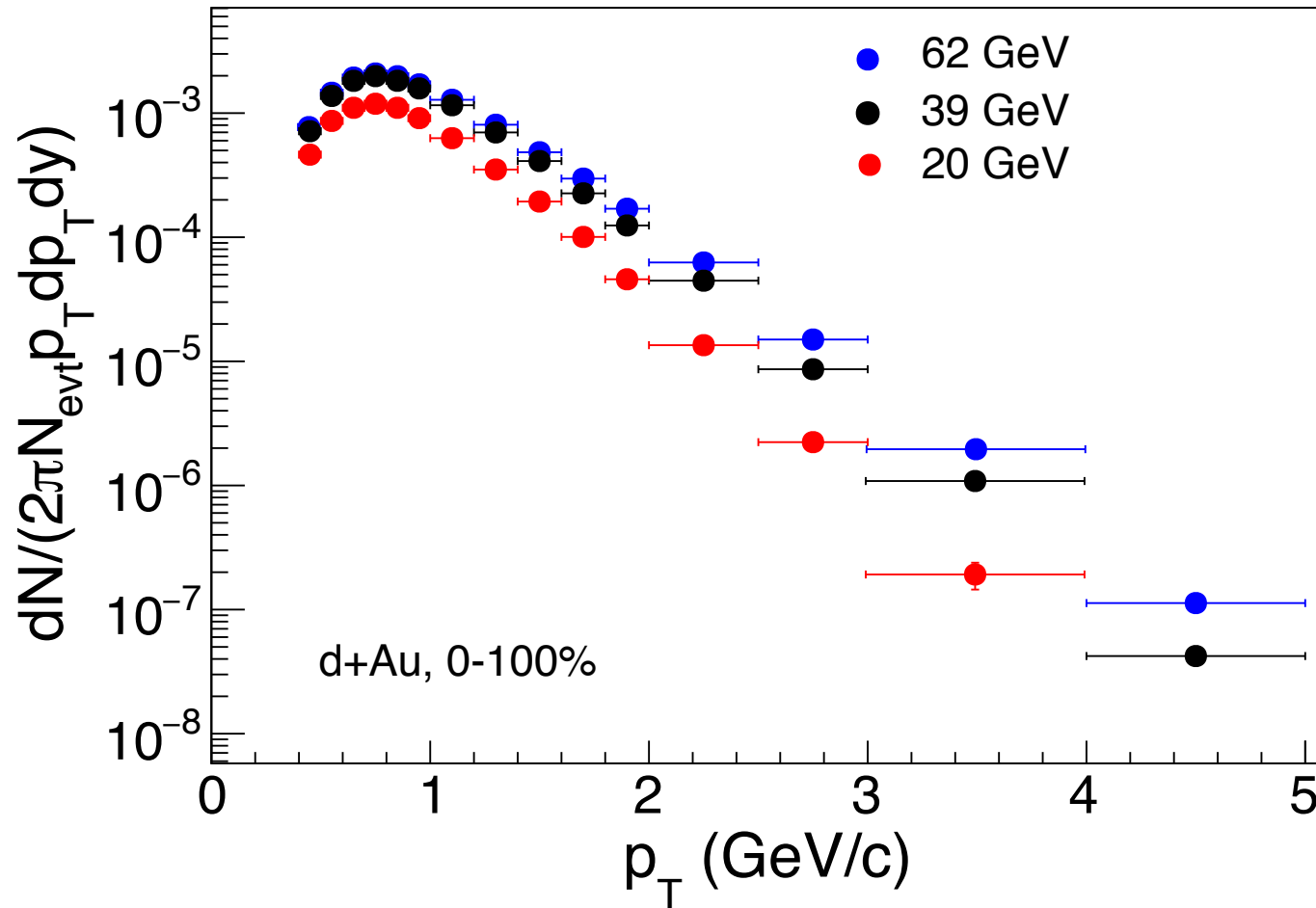
ϕ mass :

Deviation from PDG values at low p_T could be due to kaon energy loss in detector material

ϕ width :

Deviation from PDG values could be due to finite momentum resolution of TPC

Efficiency Uncorrected Spectra



Summary

- Efficiency uncorrected ϕ -meson spectra in d+Au collision at 20, 39 and 62 GeV are presented.
- Need Embedding for Physics Conclusion.

Outlook:

1) Analysis of Omega Baryon spectra.