Transverse momentum fluctuations – energy dependence (first results)

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What are we looking for?

- Enhanced dynamical fluctuations for systems close to the phase transition
- Exotic, unexpected, interesting effects

Plan

- Data sets
- Event and track selection criteria
- How to select forward-rapidity region?
- Acceptance plots for different energies
- Common acceptance for forward-rapidity
- Two-particle correlation plots and Φ_{pT} for forward -rapidity
- Common acceptance for mid-rapidity
- Two-particle correlation plots for mid-rapidity
- What next?

Data sets

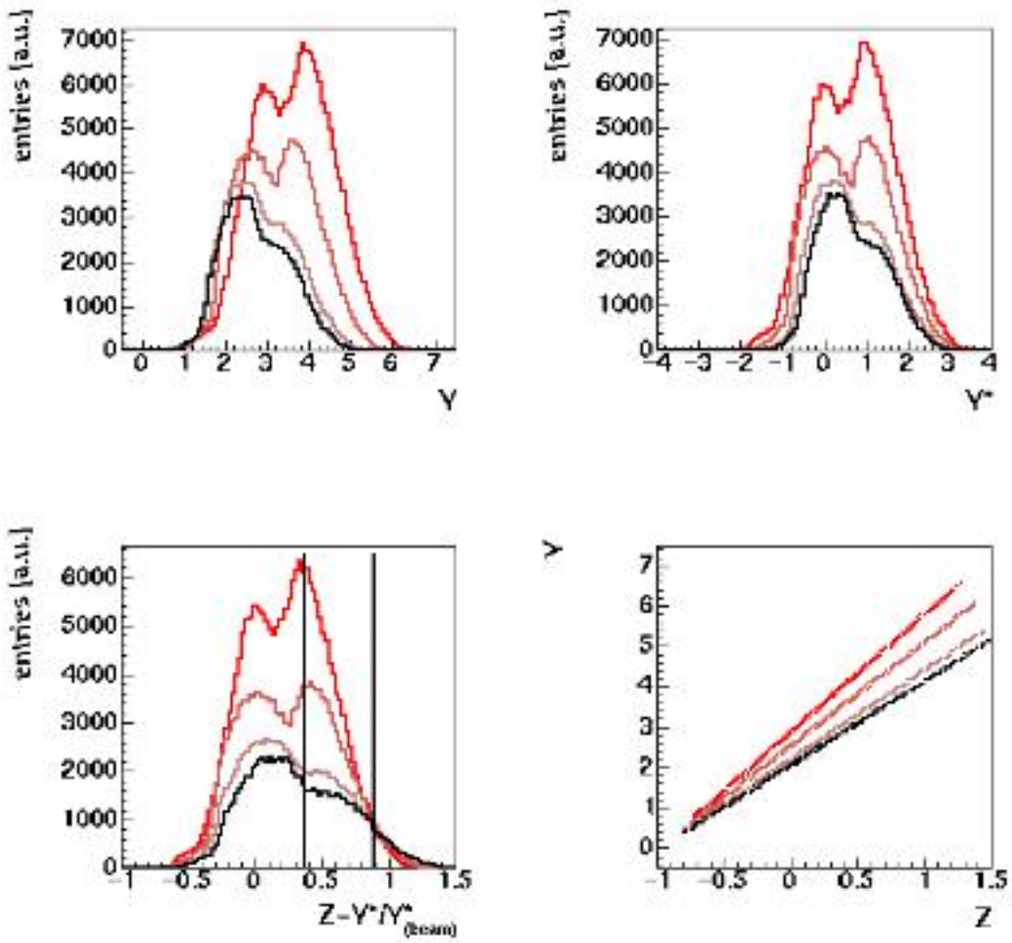
- 30 AGeV, STD+, 02J, 7.2% central
- 40 AGeV, STD-, 00C, 7.2% central
- 80 AGeV, STD+, 01E, 7.2% central
- 158 AGeV, STD+, 00B, 7.2% central,

  Eveto < 10868 GeV , run.number > 1398 (10%)

Event and track selection criteria

- Cut on x, y, z position of the fitted vertex
- n.trk.fit/n.trk.out > 0.25
- z.first < 200 cm
- $|bx| < 2$ cm, $|by| < 1$ cm
- n.m.p > 30, n.p/n.m.p > 0.5
- $0.005 < p_T < 1.5$ GeV/c

How to select forward-rapidity?

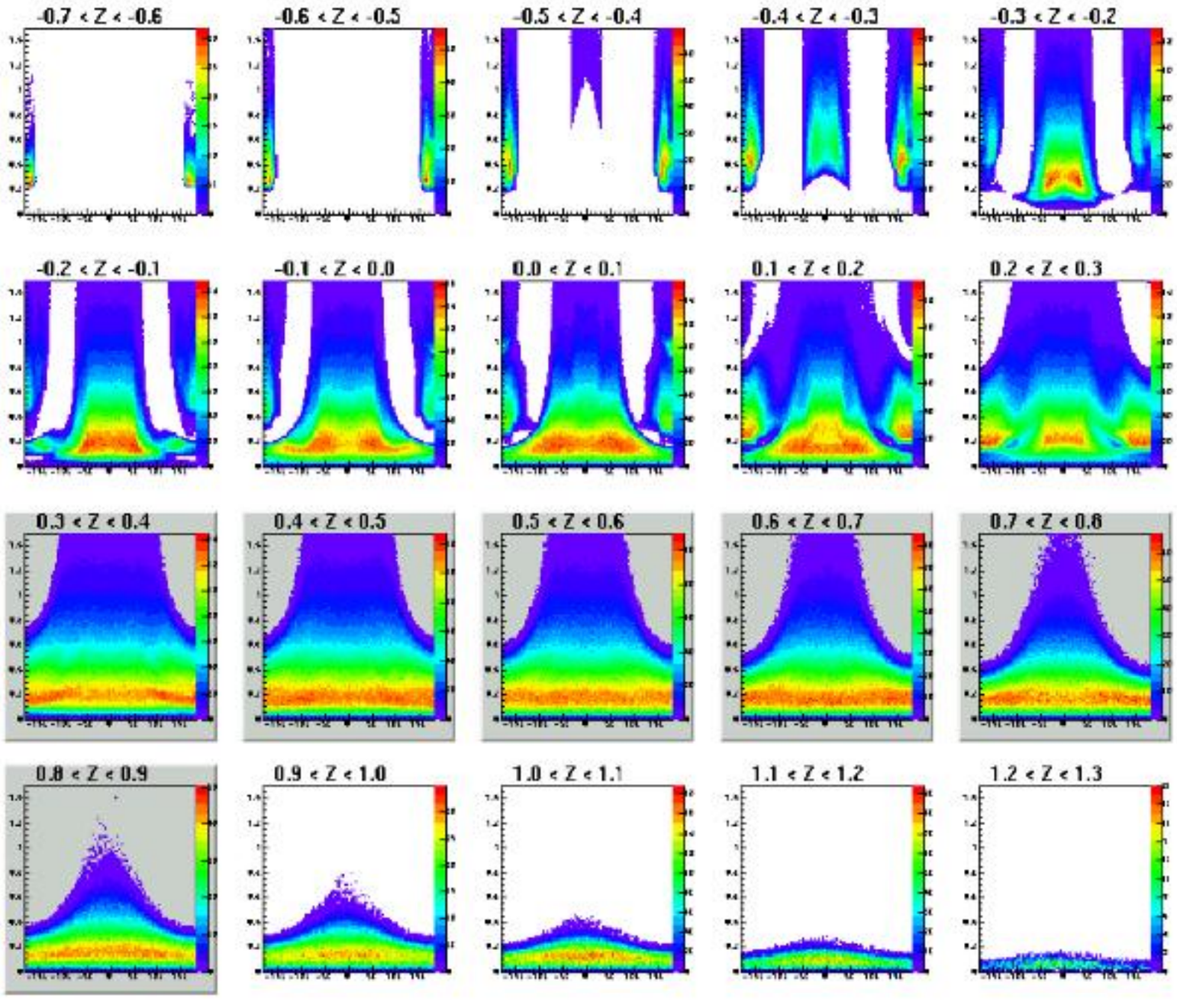


- $Z = Y^* / Y^*_{(beam)}$
- The same region for all energies:

$$Z \in (0.375; 0.890)$$

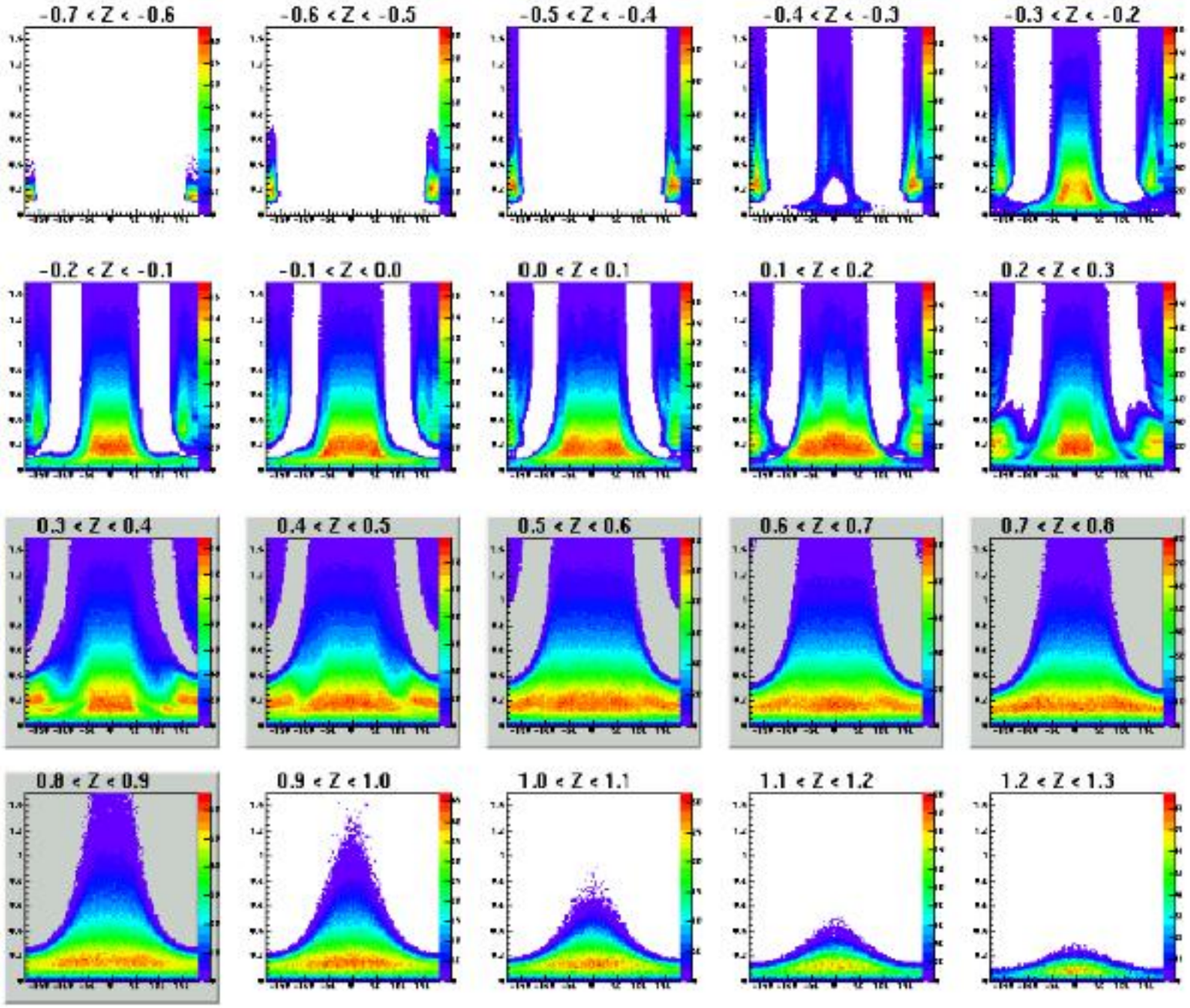
p_T versus ϕ for 158 AGeV

(gray background – forward-rapidity)



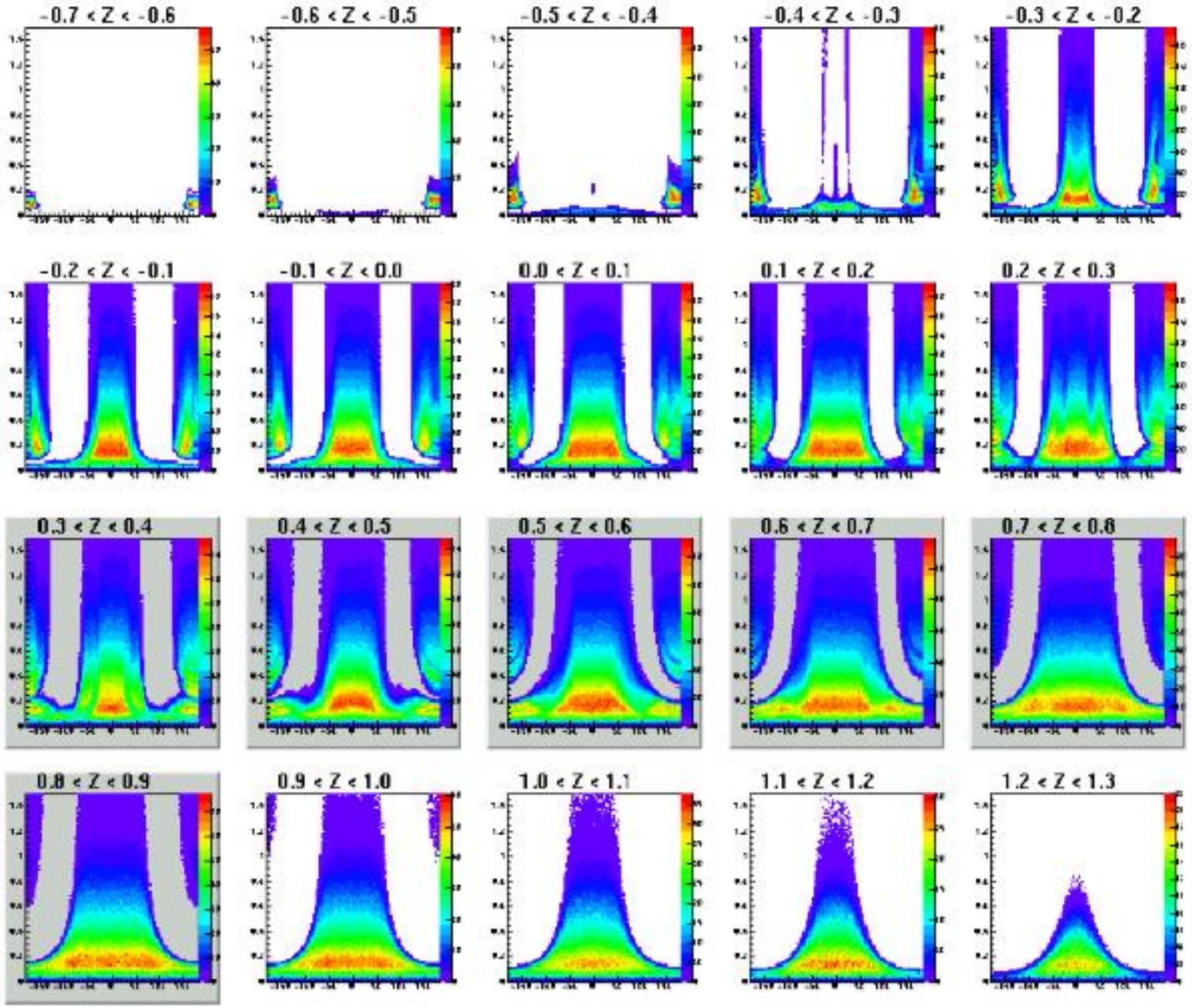
p_T versus ϕ for 80 AGeV

(gray background – forward-rapidity)



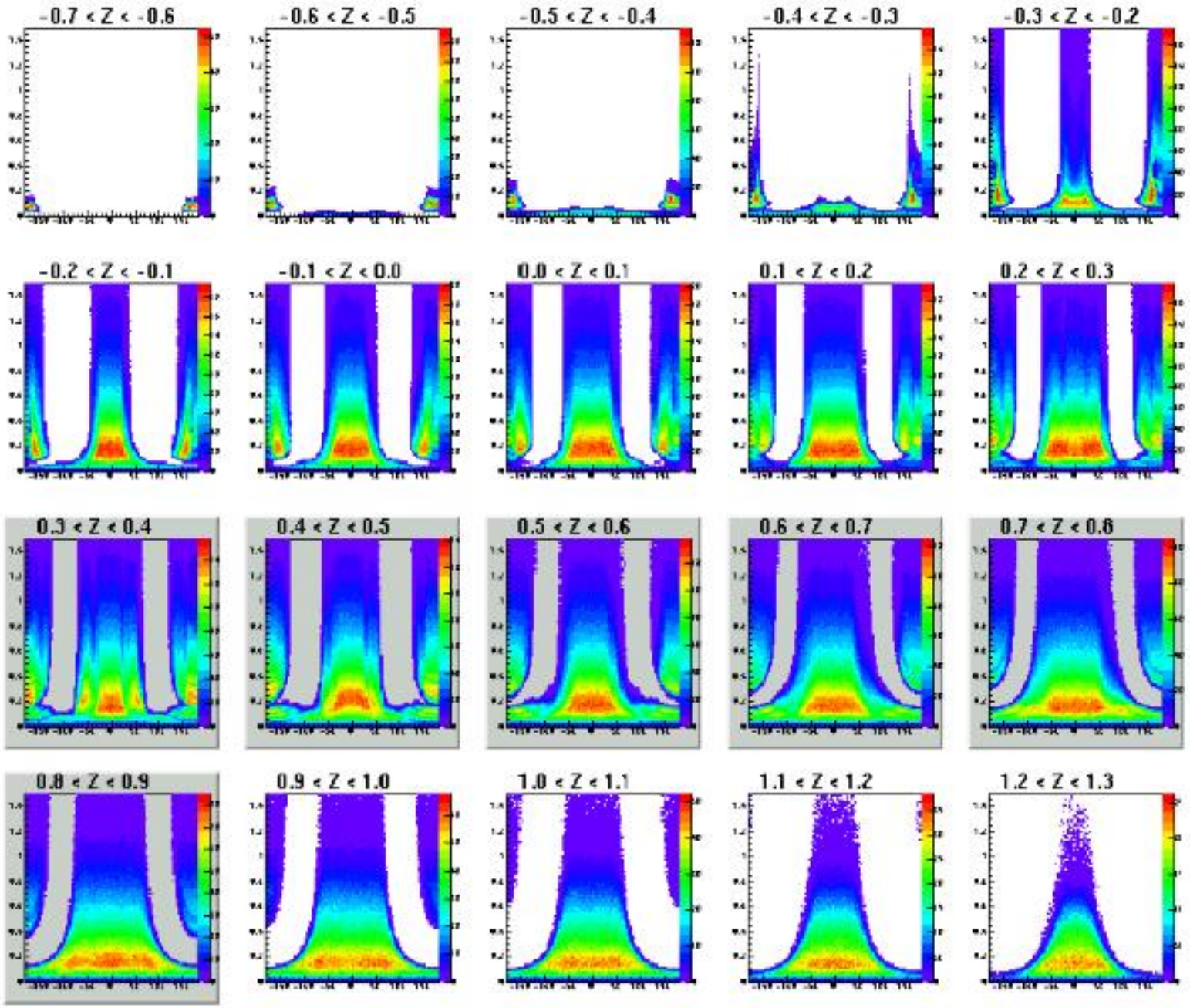
p_T versus ϕ for 40 AGeV

(gray background – forward-rapidity)



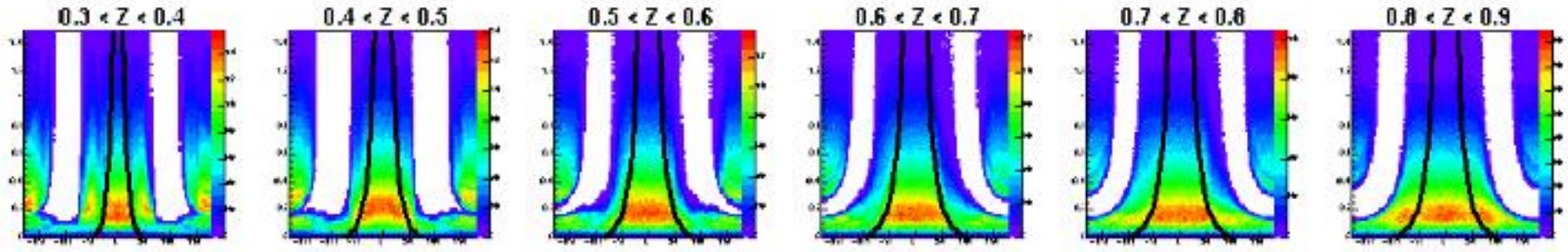
p_T versus ϕ for 30 AGeV

(gray background – forward-rapidity)

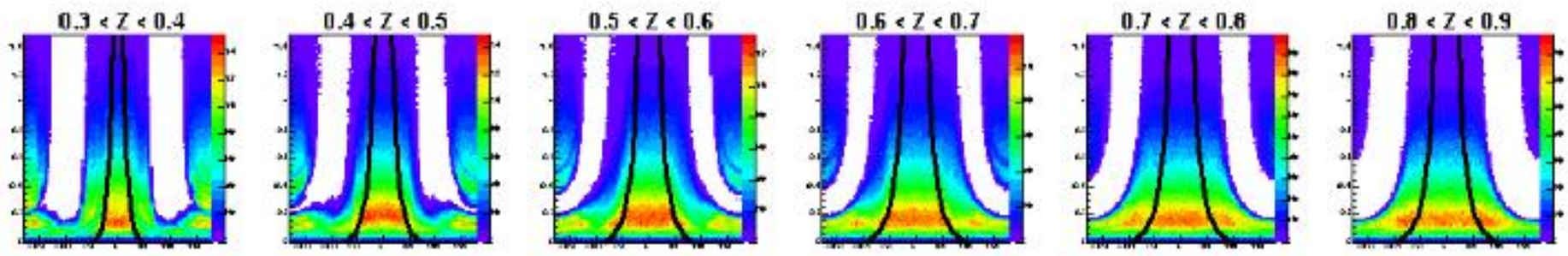


Common acceptance for forward-rapidity region

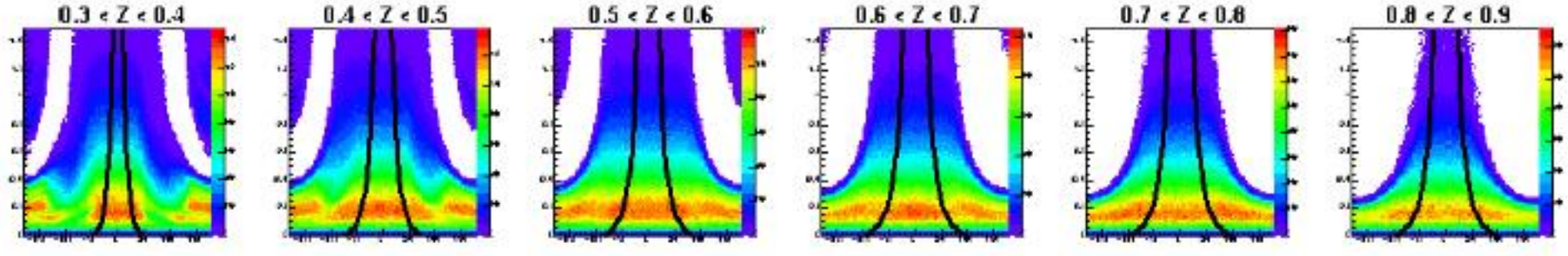
30 AGeV



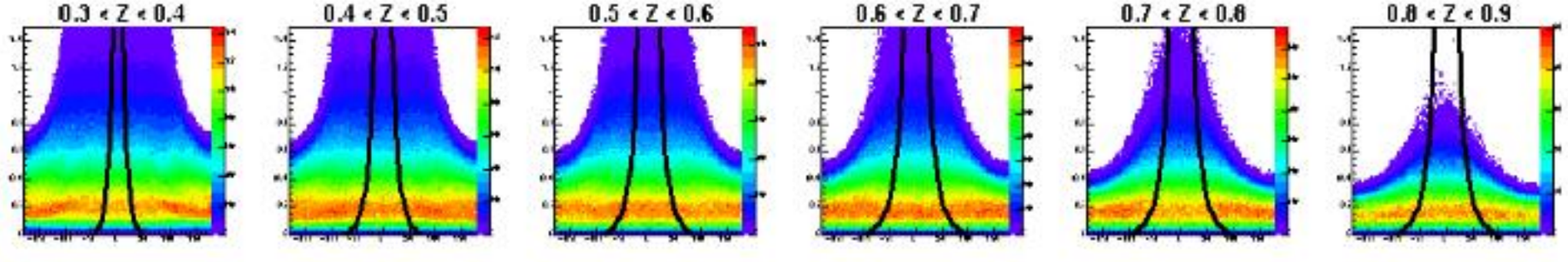
40 AGeV



80 AGeV



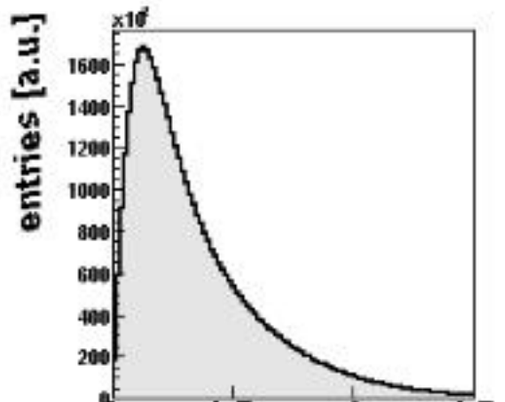
158 AGeV

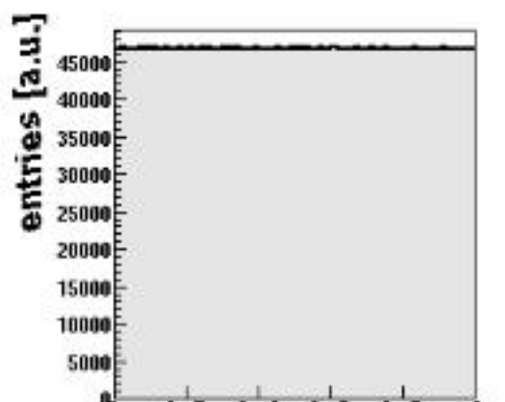


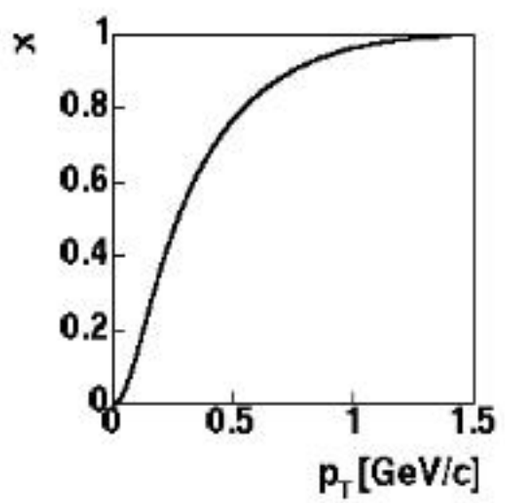
Two-particle correlation plot

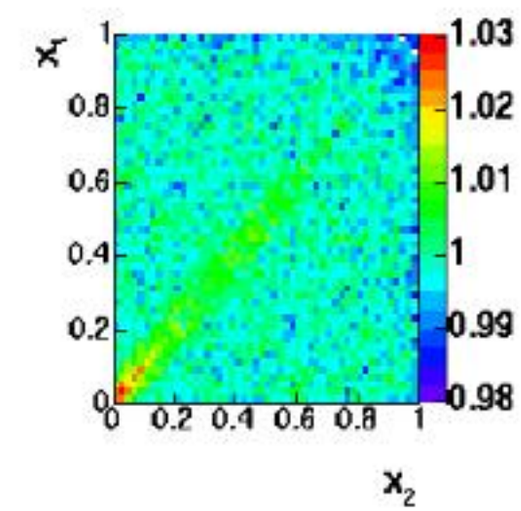
(example for 30 AGeV)

- Forward-rapidity only
  Z: (0.375 ; 0.890)



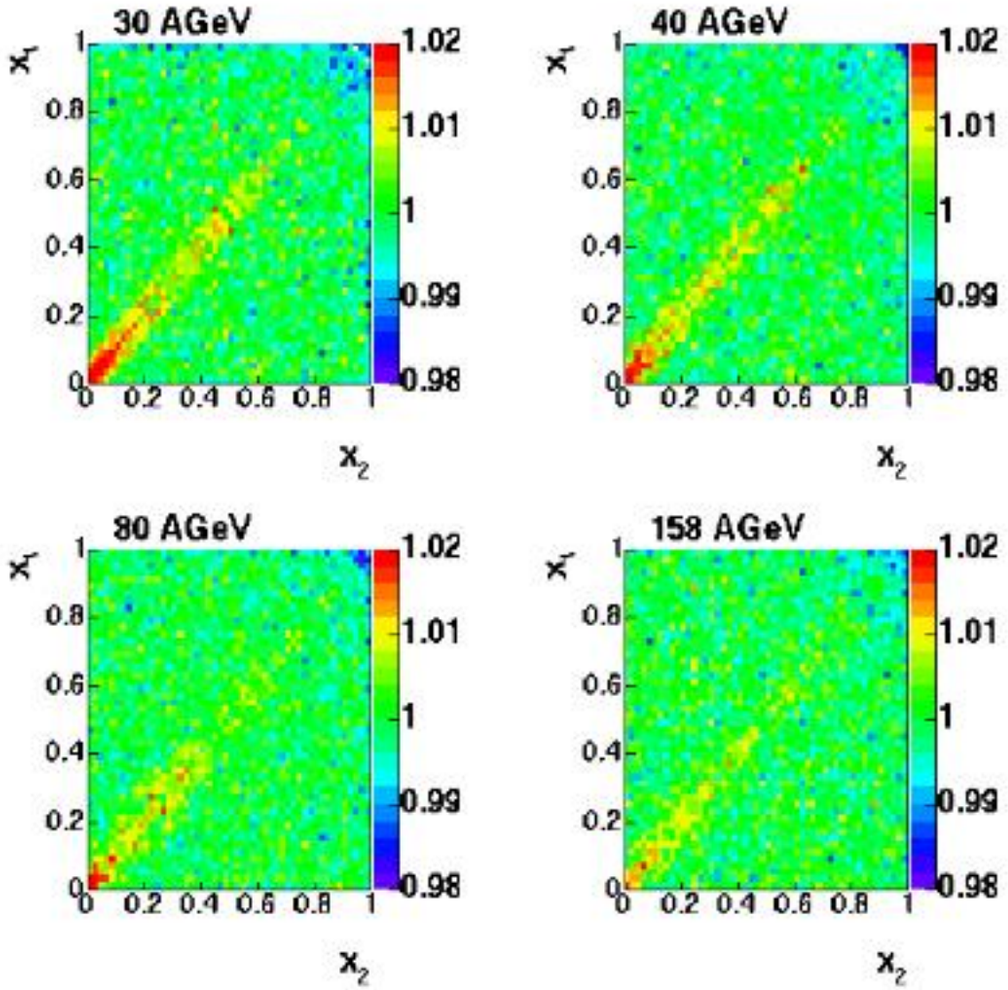






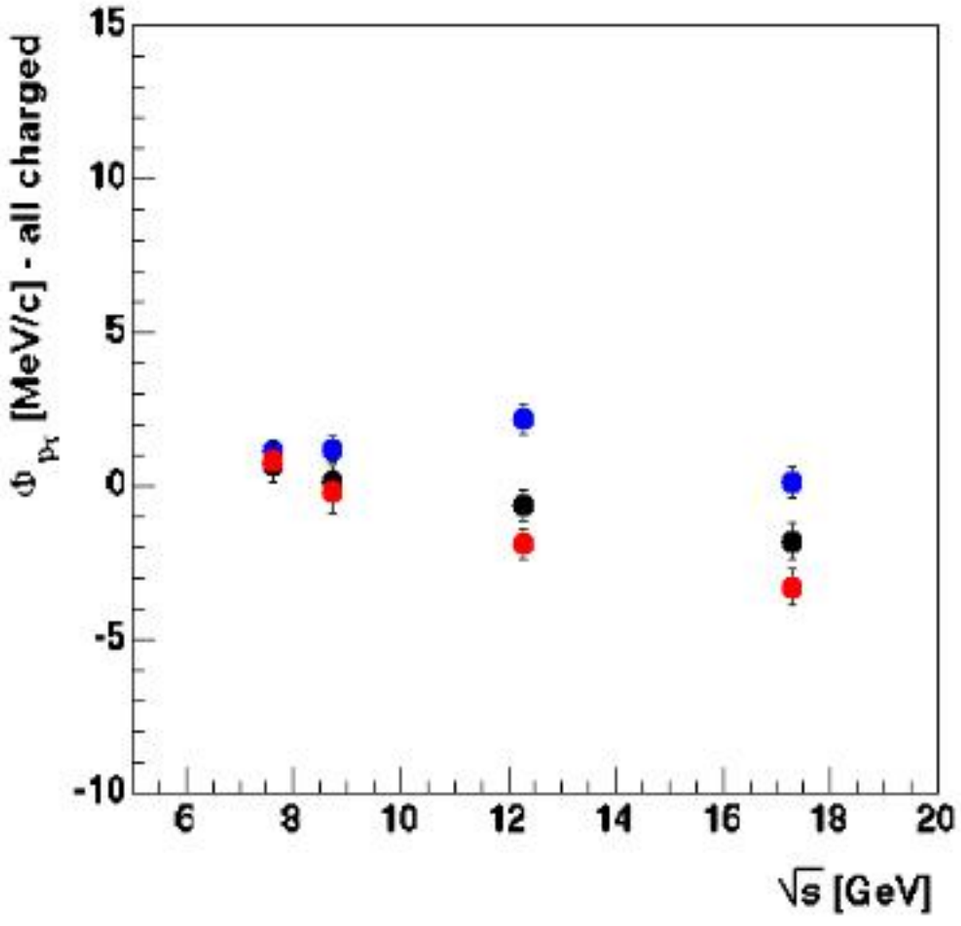
Two-particle correlation plots – comparison for forward-rapidity

(the same scale)



- BE correlations
- No significant energy dependence for forward-rapidity

Φ_{pT} for forward-rapidity



- No stability checks -> statistical errors only
- No TTR corrections
- Probably no energy dependence for forward-rapidity

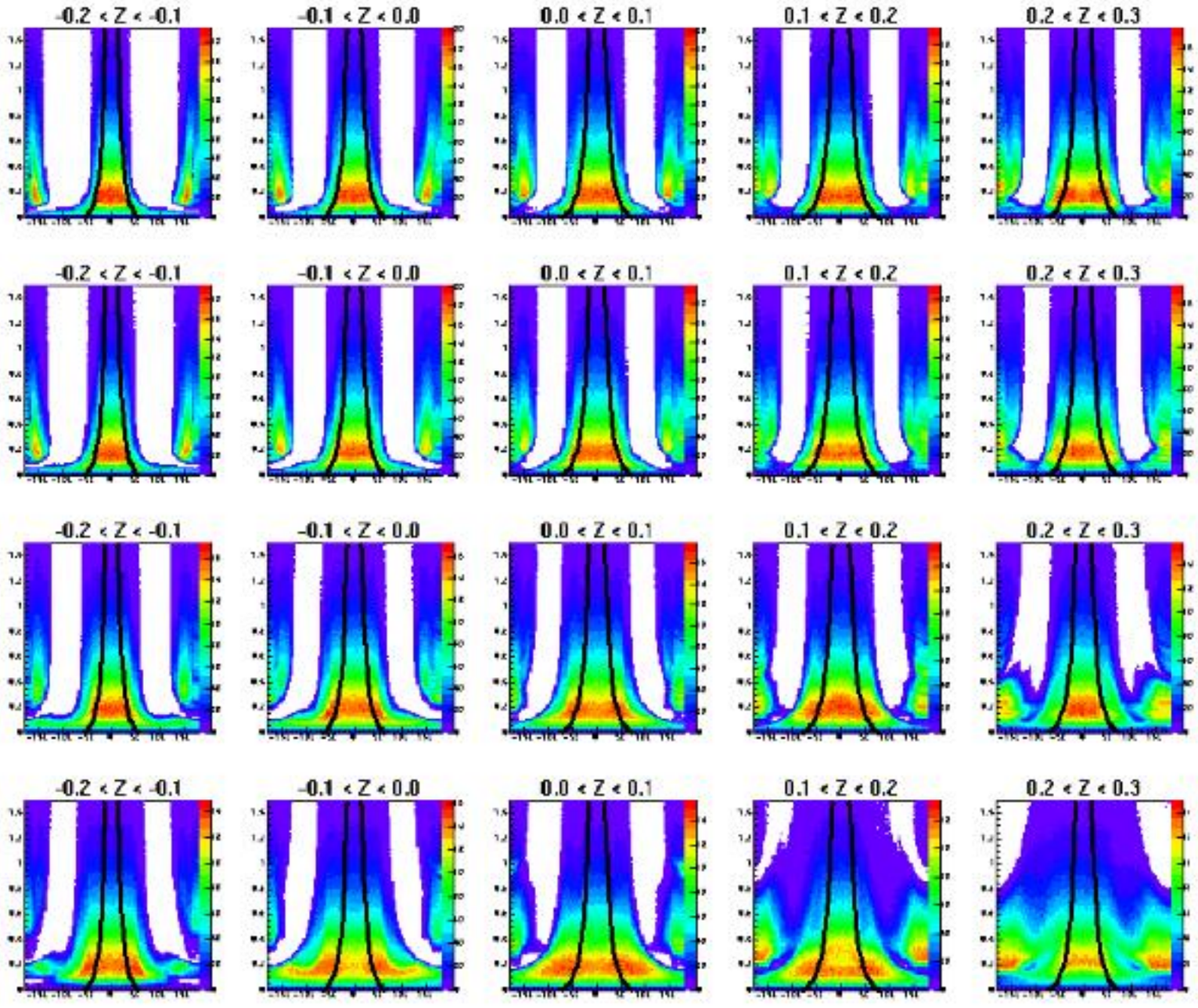
Common acceptance for mid-rapidity region $Z \in (-0.2\ ;\ 0.3)$

30 AGeV

40 AGeV

80 AGeV

158 AGeV



Two-particle correlation plots – comparison for mid-rapidity

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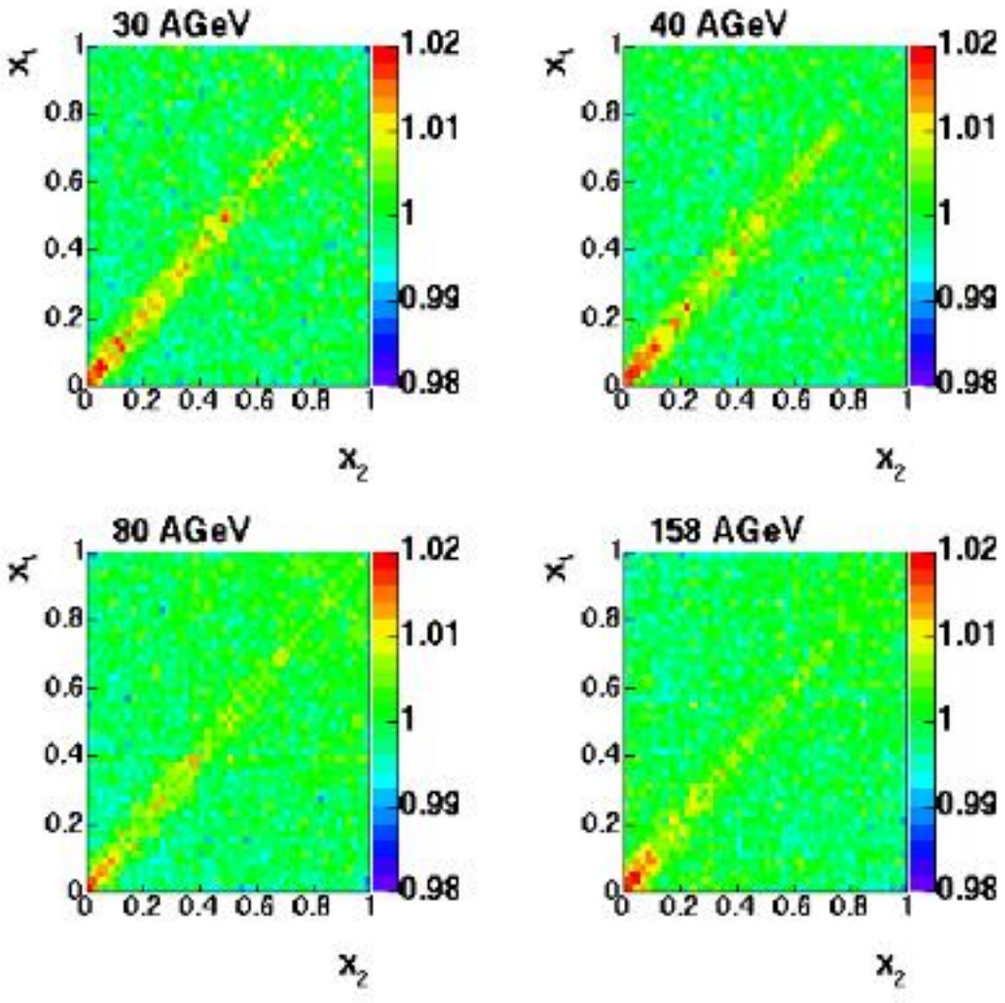

- BE corralations
- No significant energy dependence for mid-rapidity

Conclusions

No significant dynamical fluctuations for mid-rapidity and forward-rapidity regions

No significant energy dependence

the reason: limited geometrical acceptance?
Common acceptance may be better (wider) in Y*

What next?

- Φ_{pT} corrections (TTR) and systematic error estimates
- $M(p_T)$ distributions – for data and mixed events
- The same for 20 AGeV