

Nikhef

# Probing the fluctuations of energy flow within jets

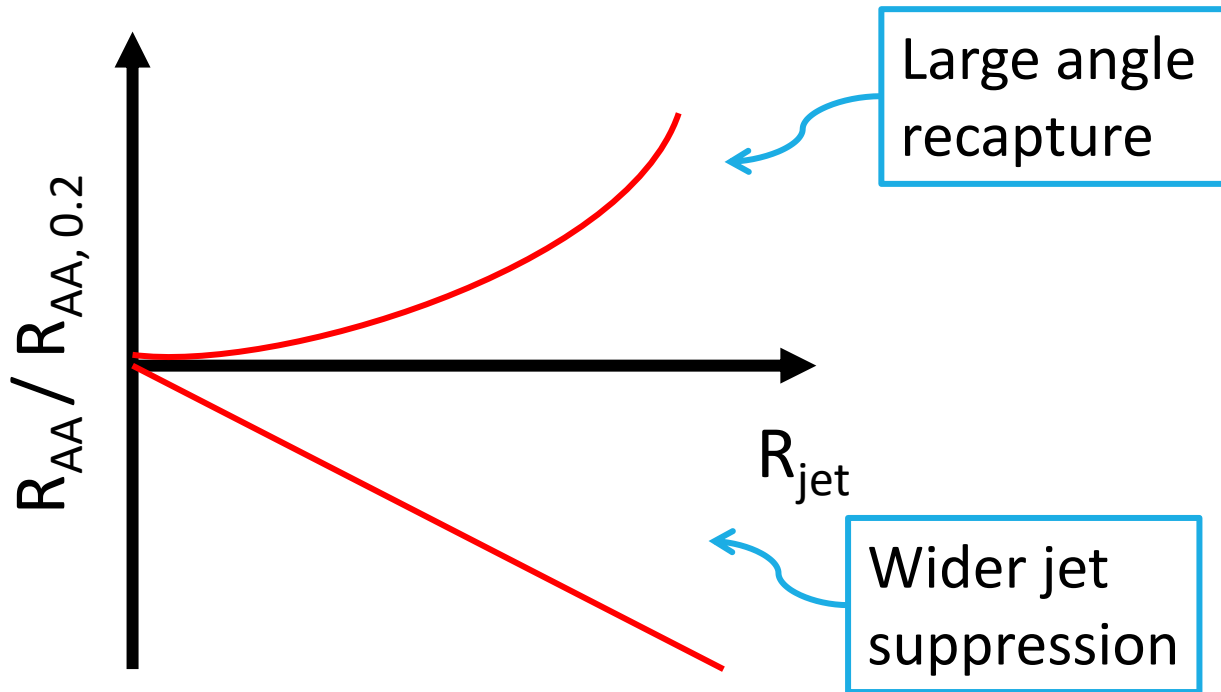


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A NEW JET SHAPE OBSERVABLE TO STUDY THE JET  
ENERGY LOSS EFFECTS DEPENDENCE ON JET RADIUS

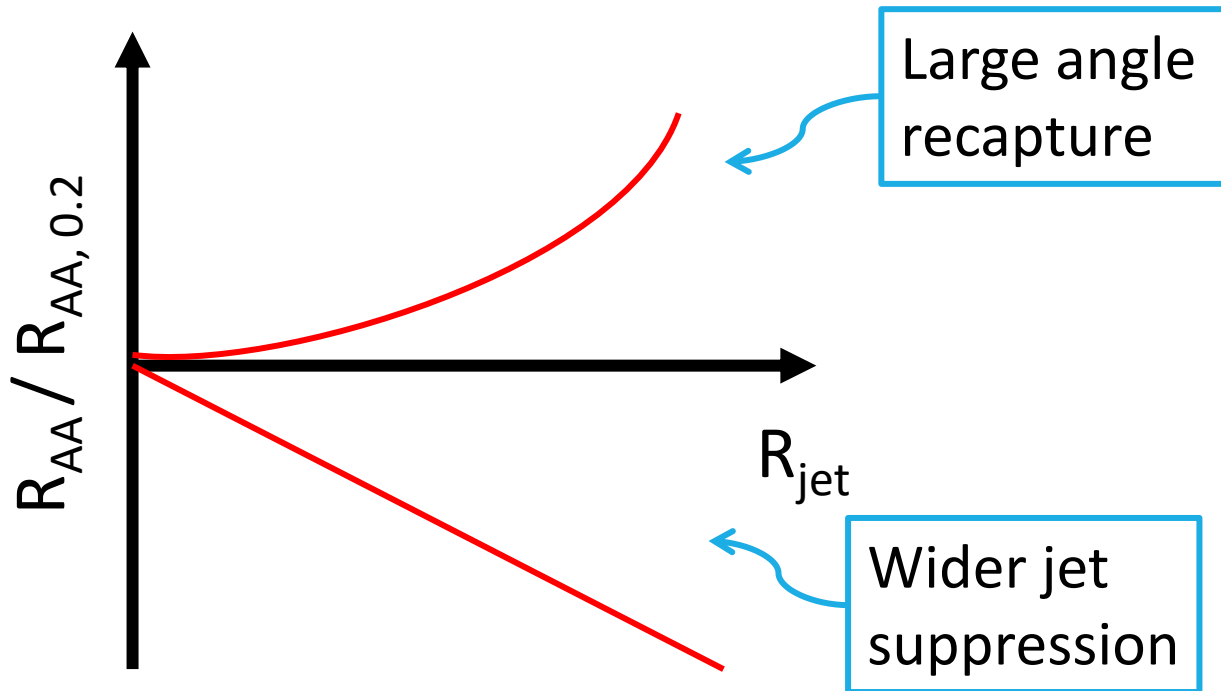
CONTACT PERSON: PLIATSKAS CHRISTOS  
([C.PLIATSKAS.STYLIANIDIS@NIKHEF.NL](mailto:C.PLIATSKAS.STYLIANIDIS@NIKHEF.NL))

# What and why?

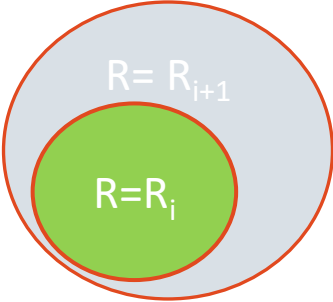


Source: QM19, Yi Chen

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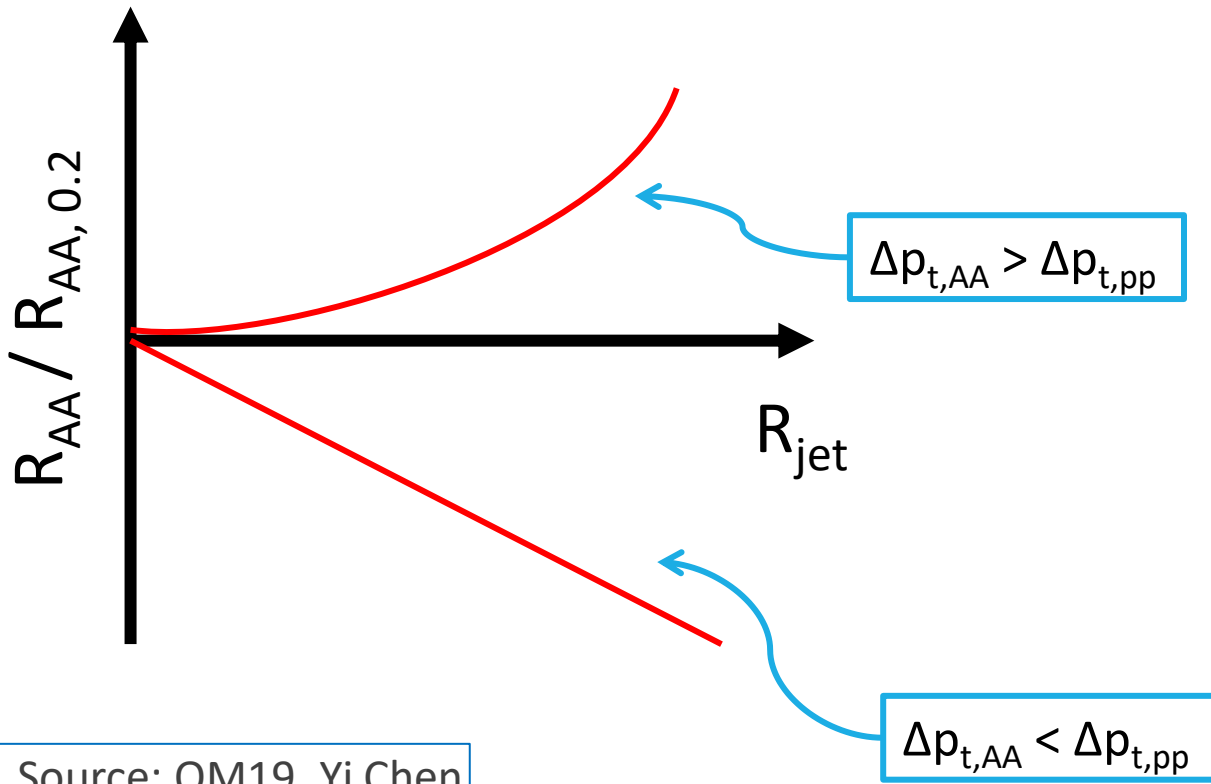


Energy flow definition:  
$$\Delta p_t = p_t(R_{i+1}) - p_t(R_i)$$



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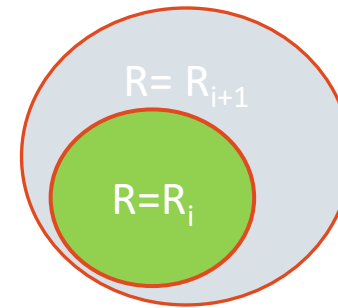
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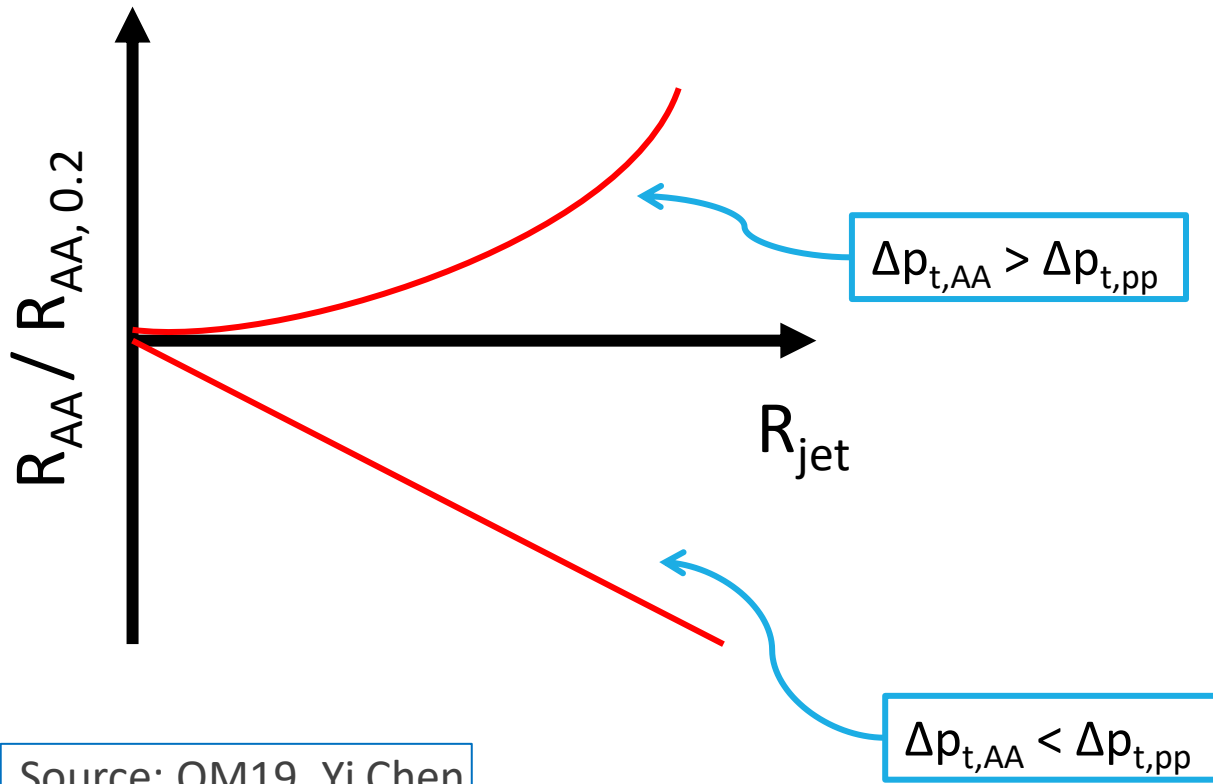
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Using a measurement in pp as baseline, study the effect of the energy loss mechanisms present in PbPb

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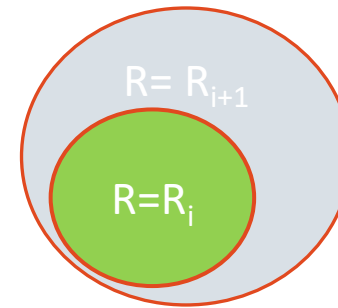
\*See talk by J. Mulligan:  
[Jet angularity and fragmentation measurements in heavy-ion collisions with ALICE](#) on Wed 06/04



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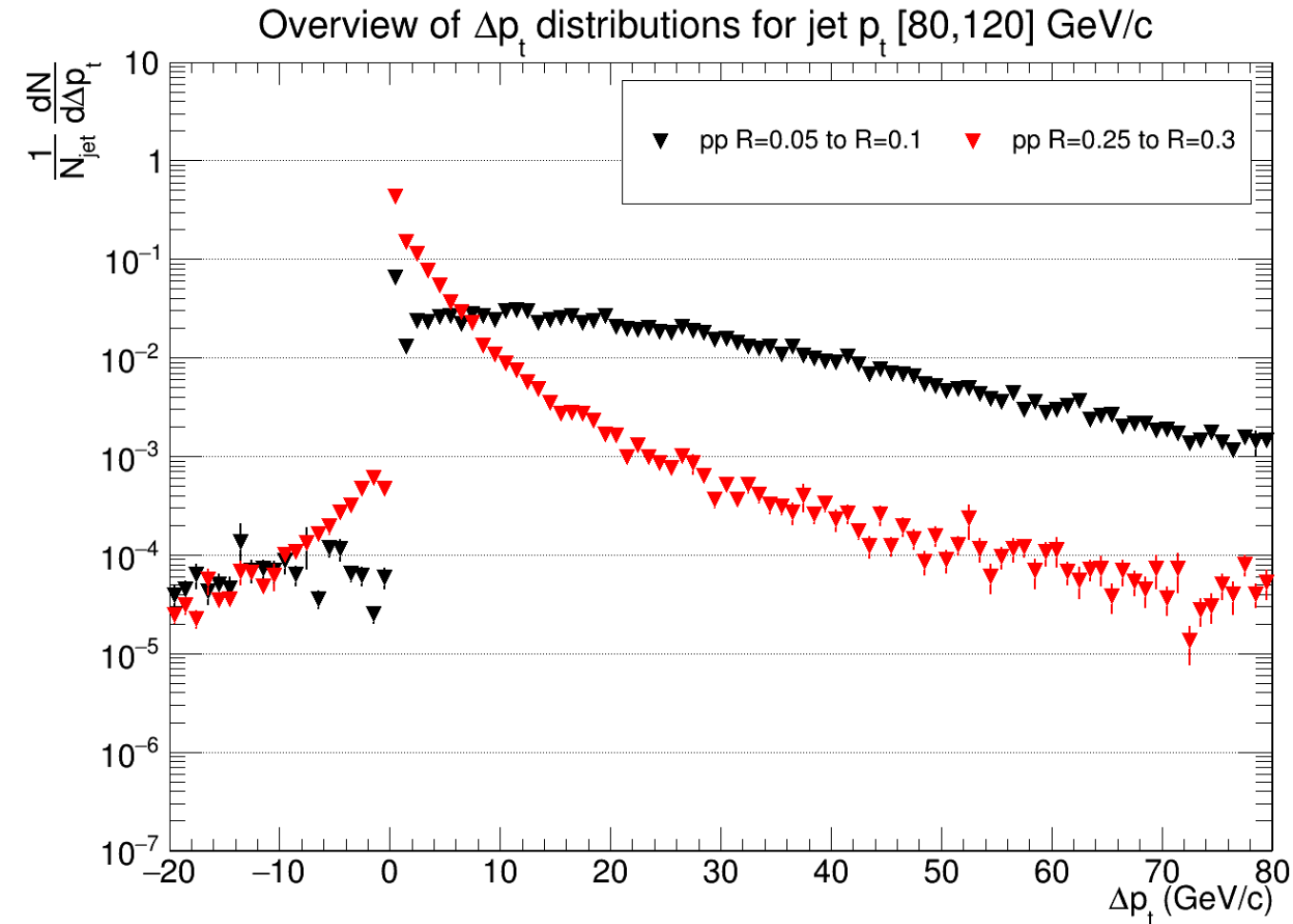
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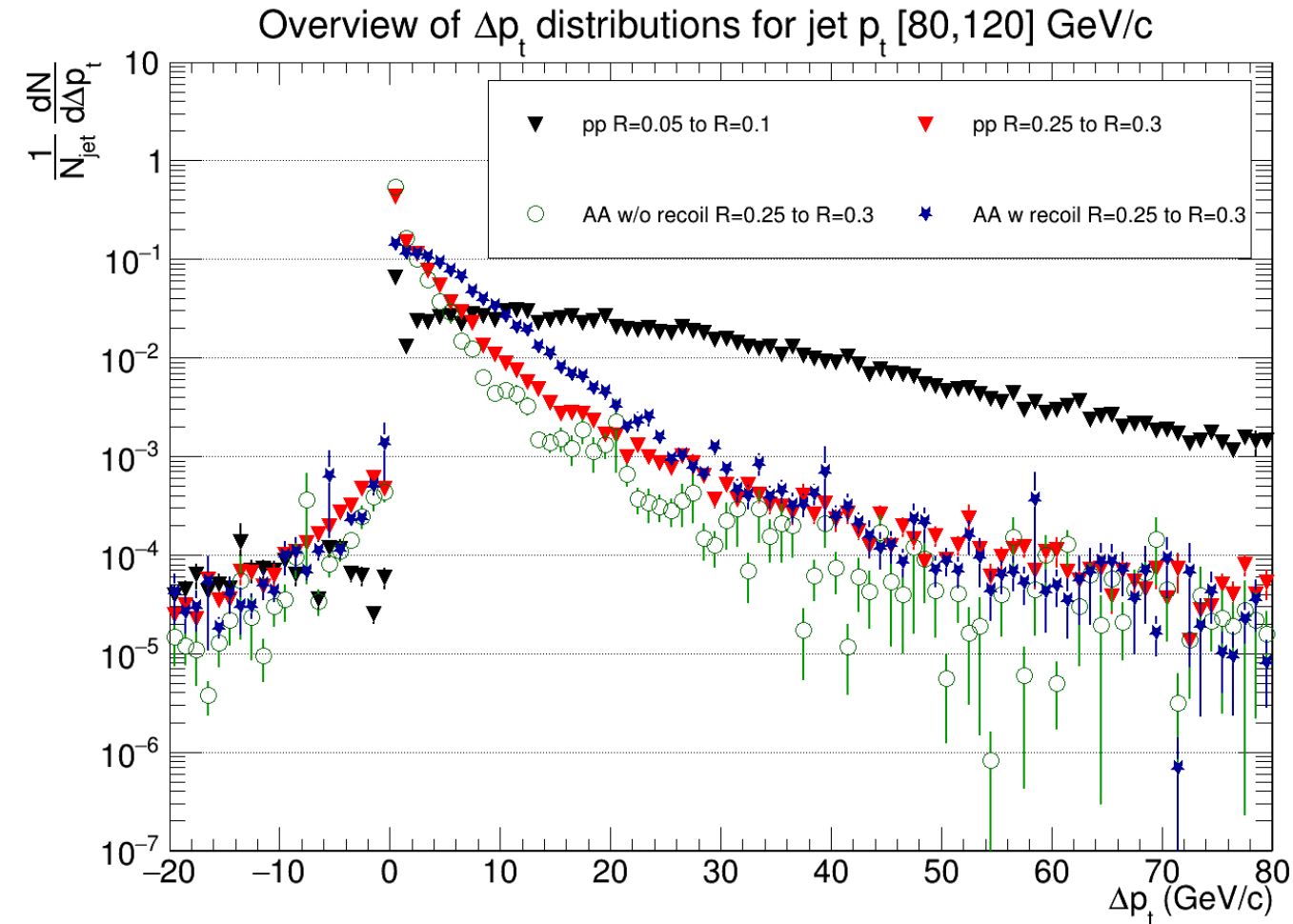
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# Jet energy flow distribution



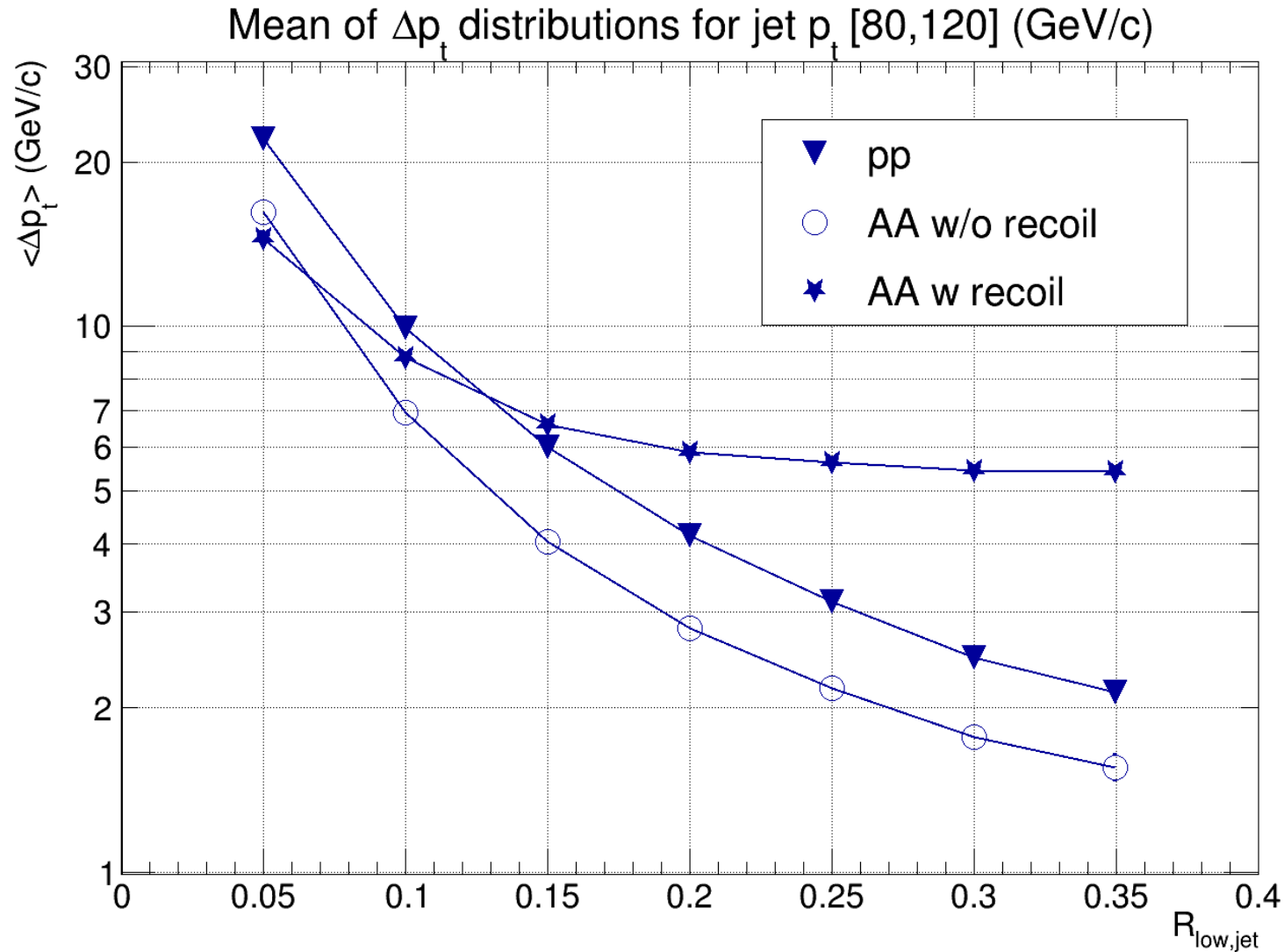
- Distributions peaked at  $\Delta p_t=0$  and fall off as  $\Delta p_t$  increases
  - Strong  $R_{\text{jet}}$  dependence.
  - Distribution falls off steeper for large  $R_{\text{jet}}$
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- Small population of  $\Delta p_t < 0 \rightarrow$  Peculiar topologies or incorrect matching on the  $\eta$ - $\phi$  plane.
- AA without recoil: Narrowing of the jet profile.
- AA with recoil: Evident contributions at large  $R_{\text{jet}}$ .

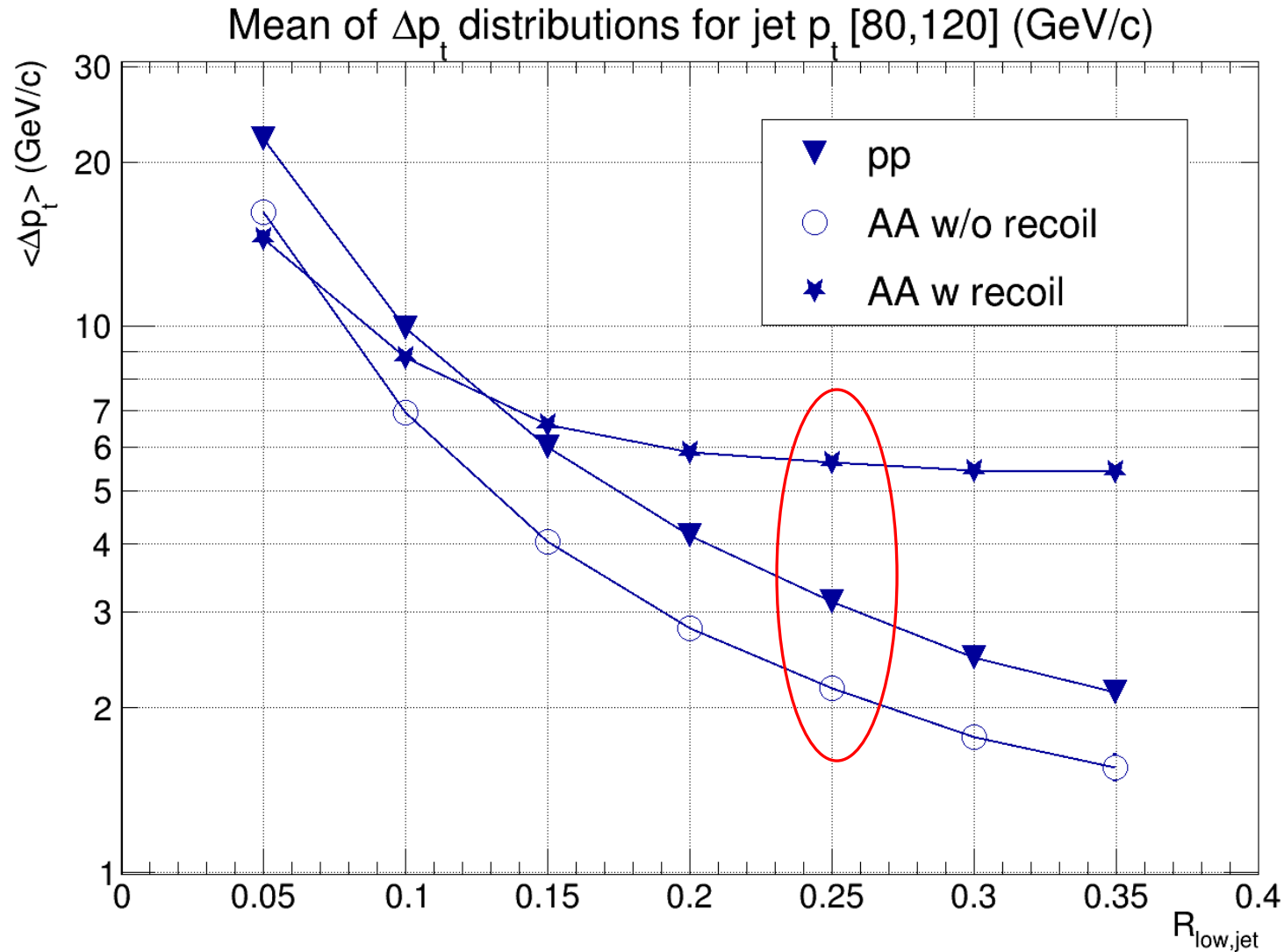
# Mean $\Delta p_t$



- Narrowing in AA evident at small  $R_{\text{jet}}$  for both recoil options.
- Large effect of recoil at large  $R_{\text{jet}}$  as expected.
- Observable is clearly sensitive to effects of jet energy loss.



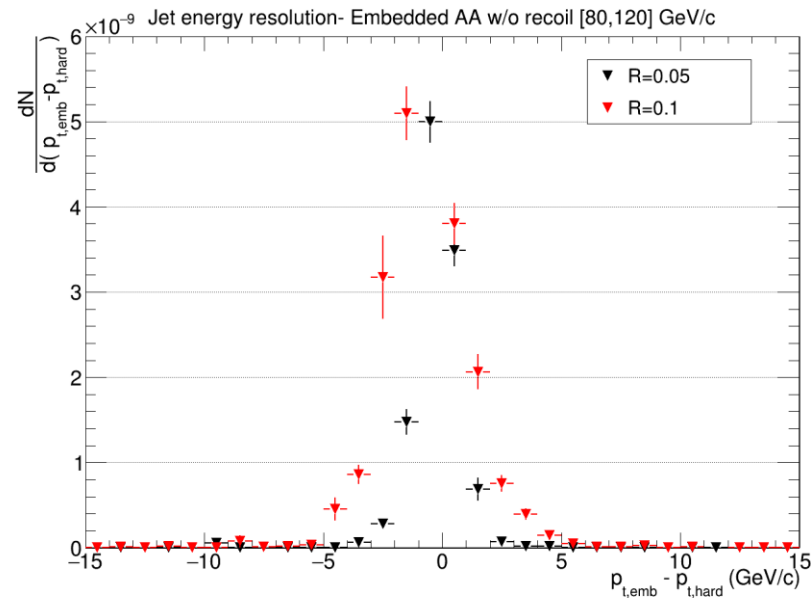
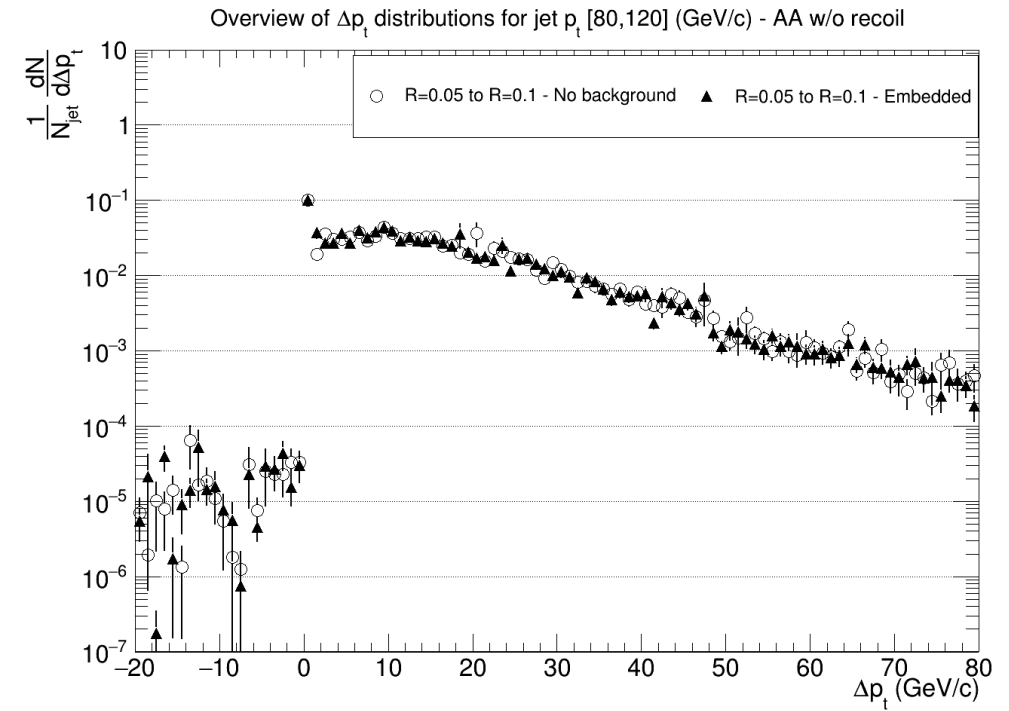
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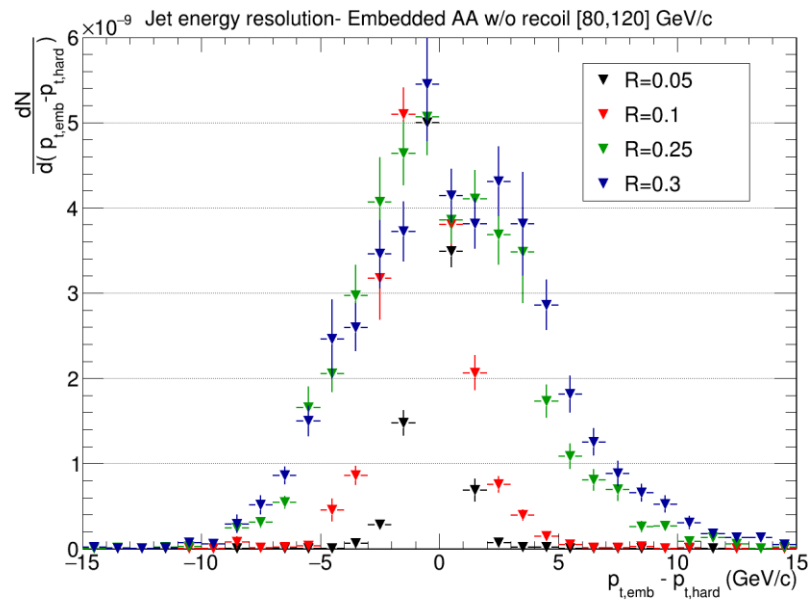
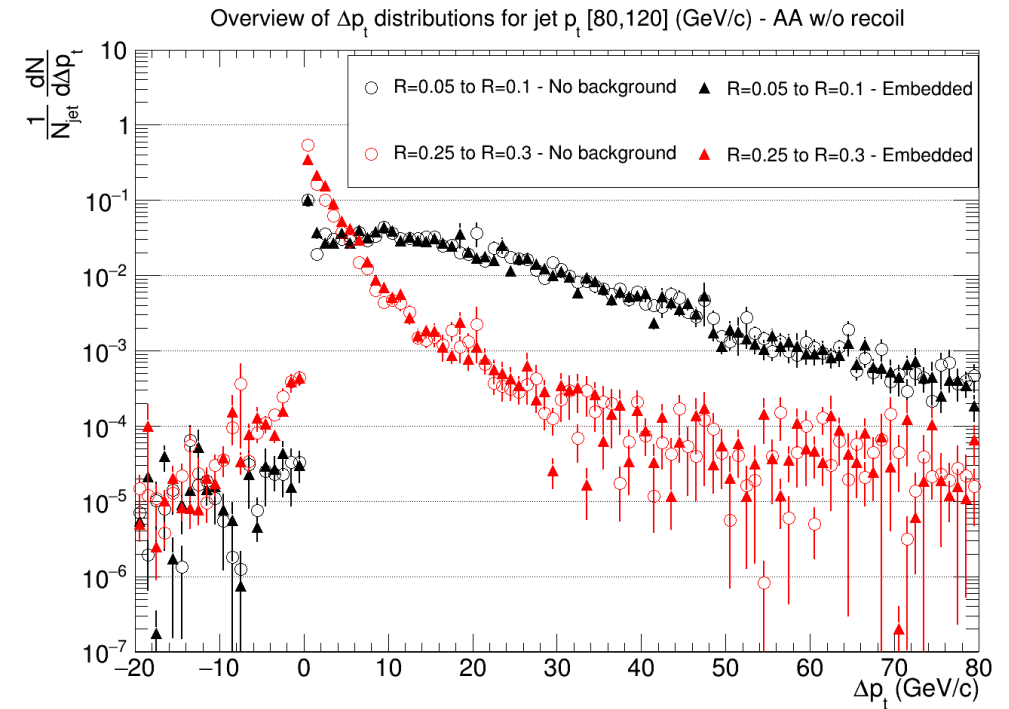
# Sensitivity to thermal background

- Simulate the effect of HI environment by embedding and retrieving the signal from thermal background.
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- Observable is sensitive to jet energy loss effects like narrowing and medium recoil.
- Effect of smearing by background fluctuations is mild.
- Next steps:
  - Perform measurement with ALICE pp and PbPb data.
  - Study the effect of e.g. coherence.