# TPC Distortion Matching Schemes

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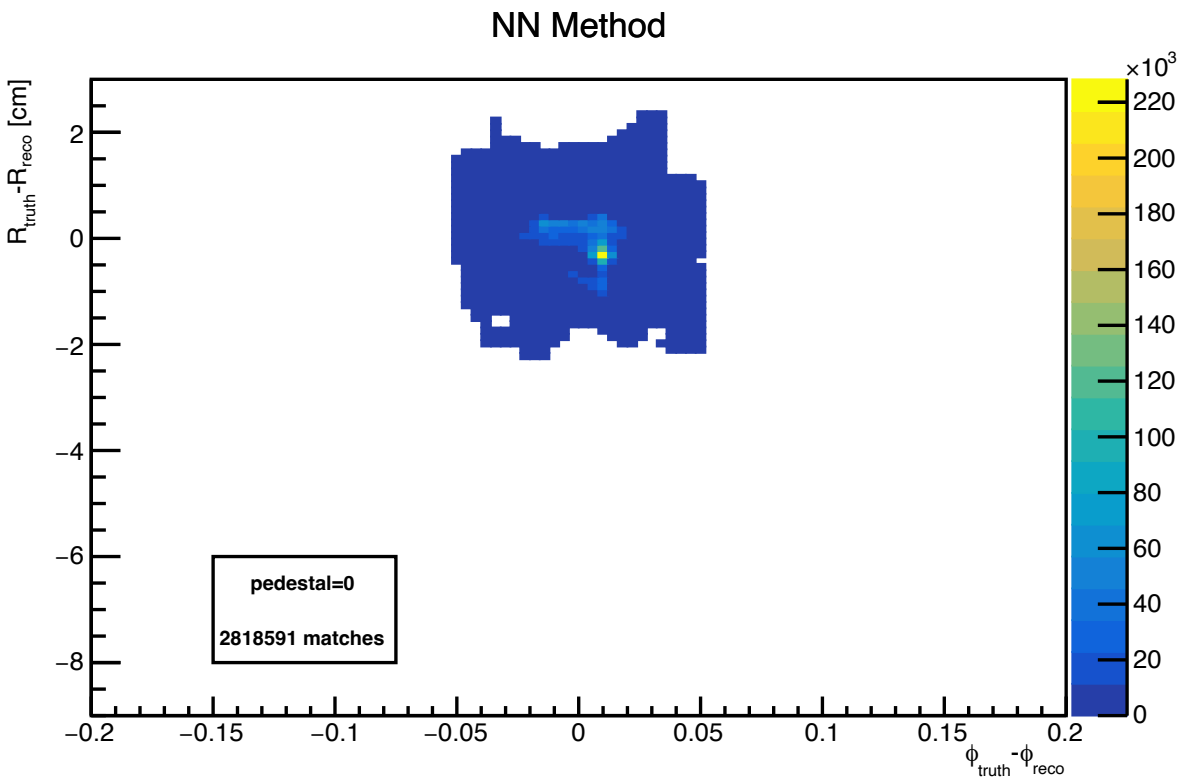
# Two Methods for Matching

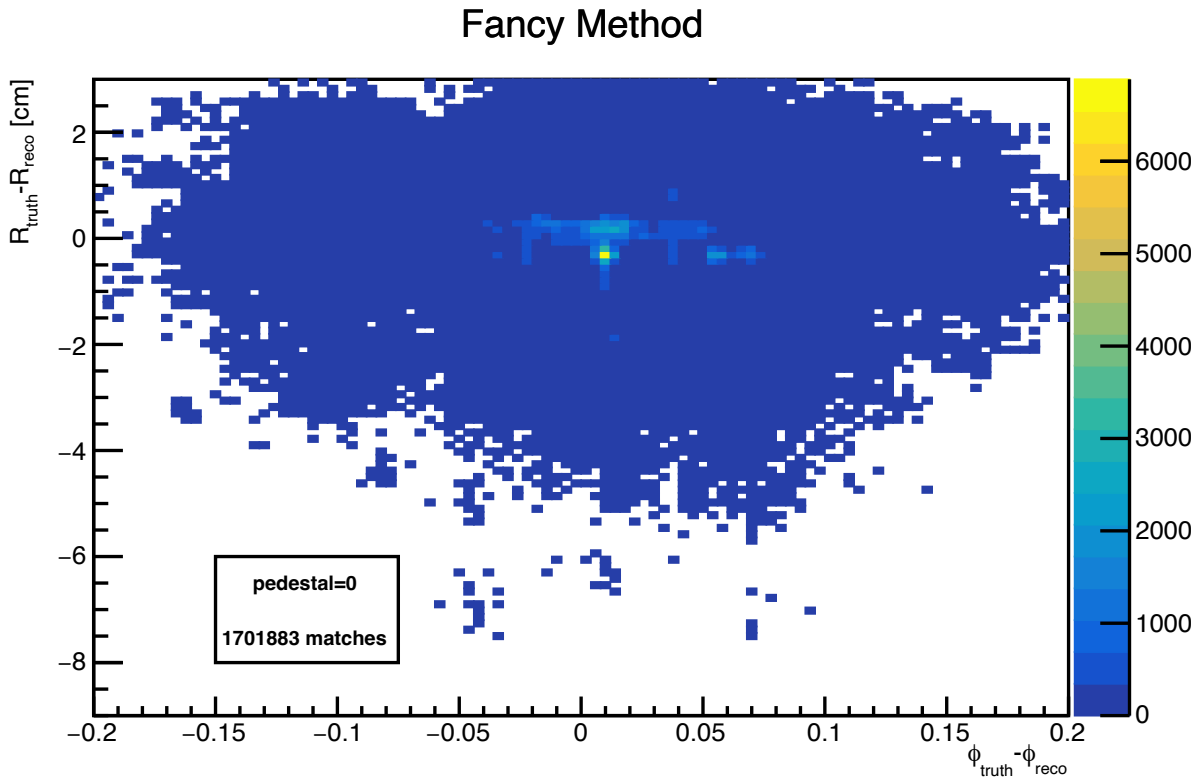
- Reco clusters need to be matched to truth stripe positions
- Originally, didn’t have static correction so distortion was large and code needed to capture this
  - Developed global radial matching scheme and global phi rotation, which worked but not always best performance
  - After doing the global matching, did nearest neighbor (NN) matching
  - Calling this method “fancy” (may change later to something like “global matching”
- Now we have a static correction, not perfect but gets us close
  - Residual distortion small, so can just do NN matching without any fancy things

# Comparing Matching Performance

- Before swapping to NN matching, need to show that it performs better than “fancy” method that uses global matching
- Using one run with no zero-suppression (ZS) with different pedestal subtraction thresholds for hits before clustering

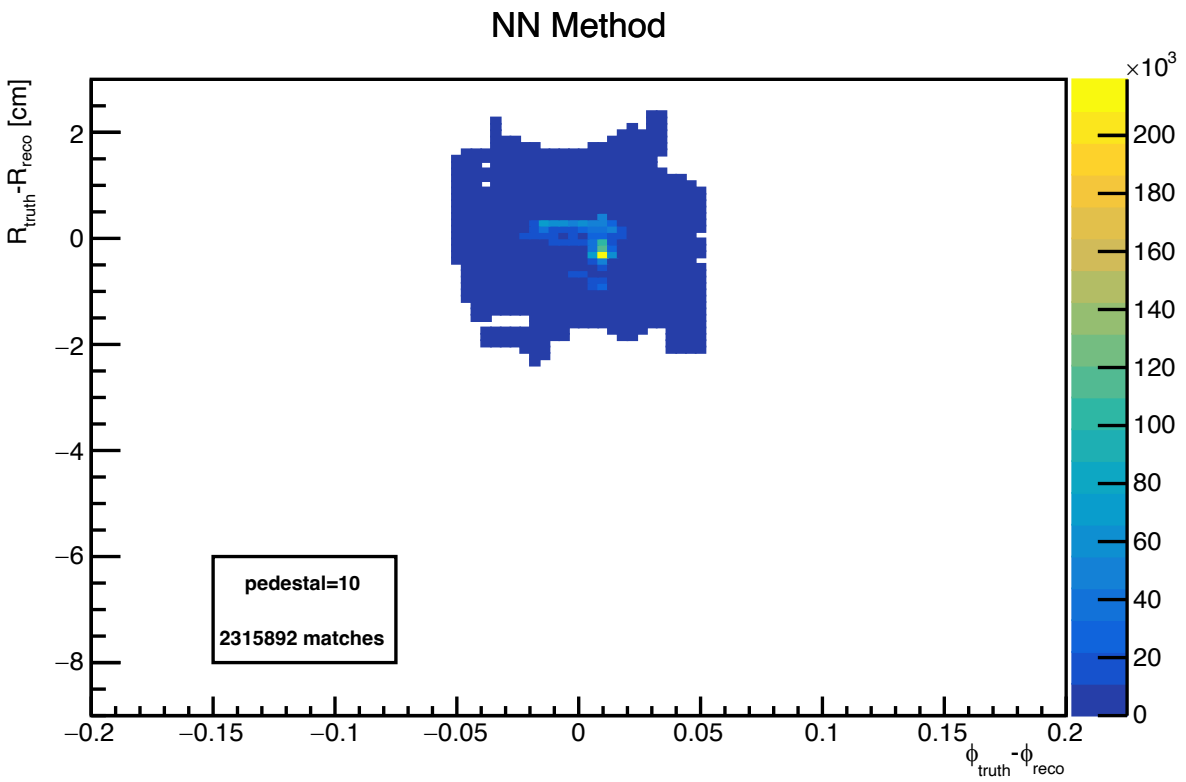
# Pedestal = 0

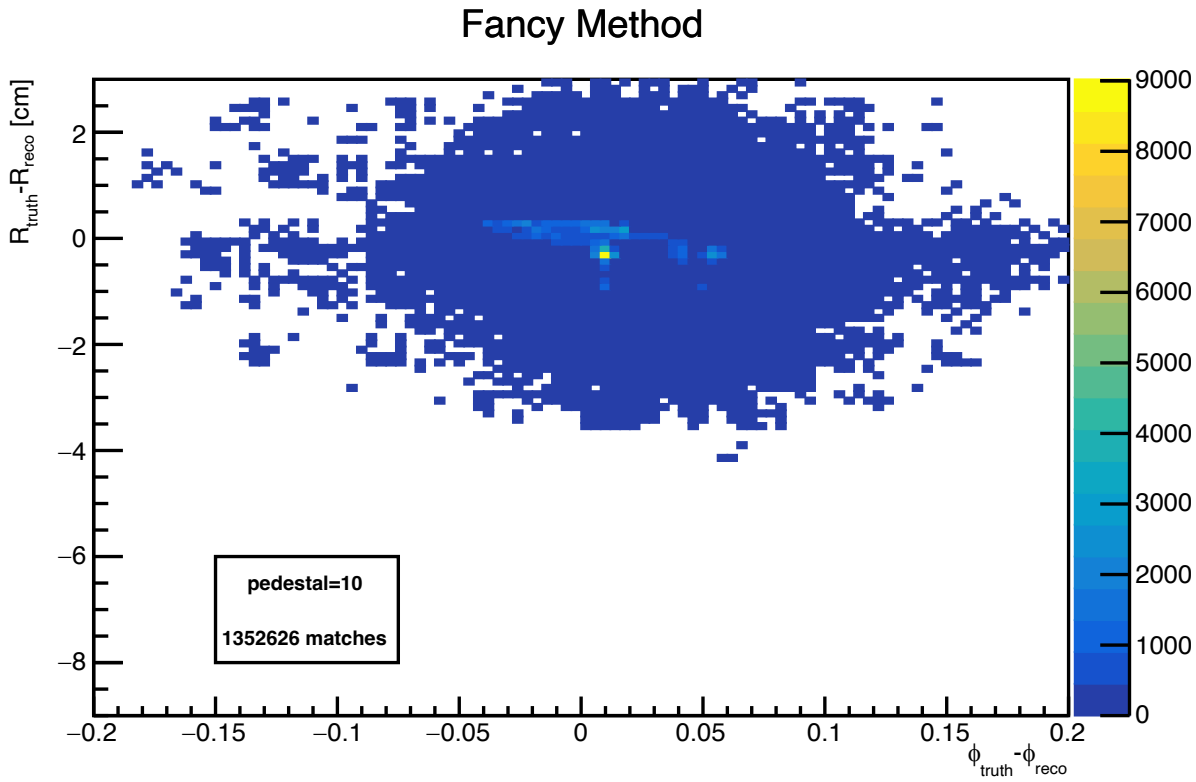



NN has more matches than fancy method and is tighter distribution

# Pedestal = 10

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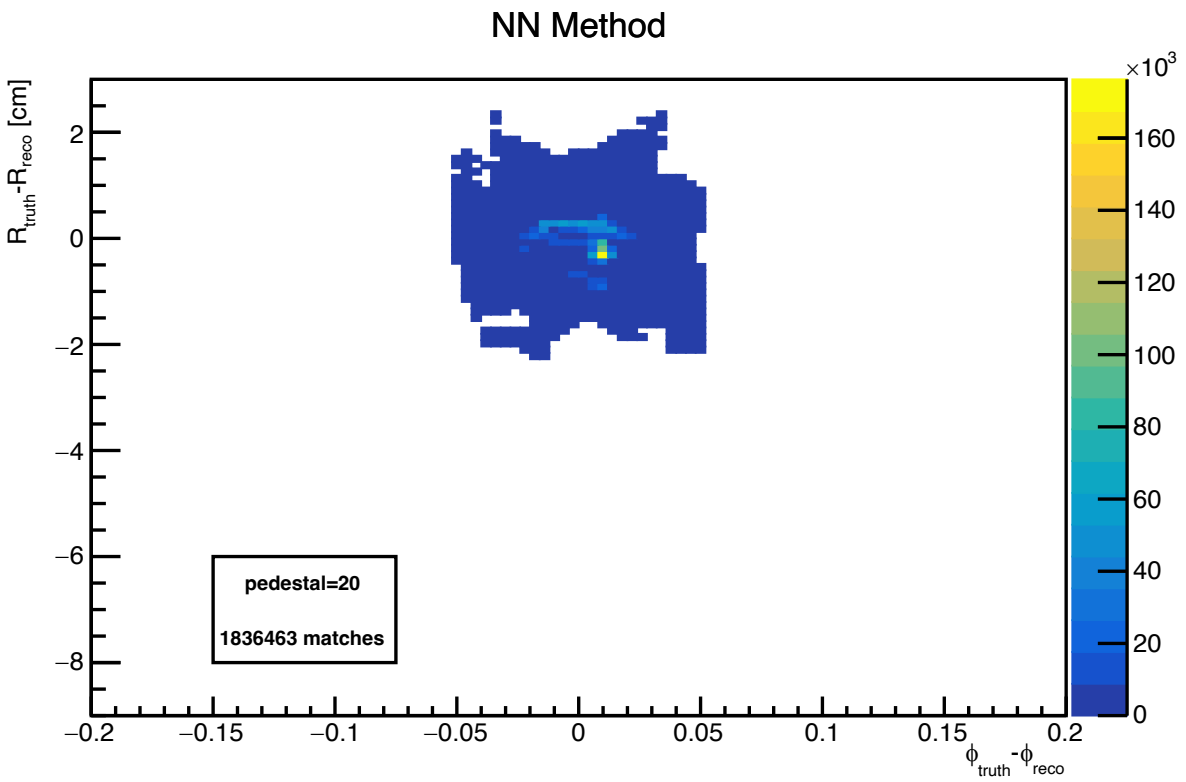
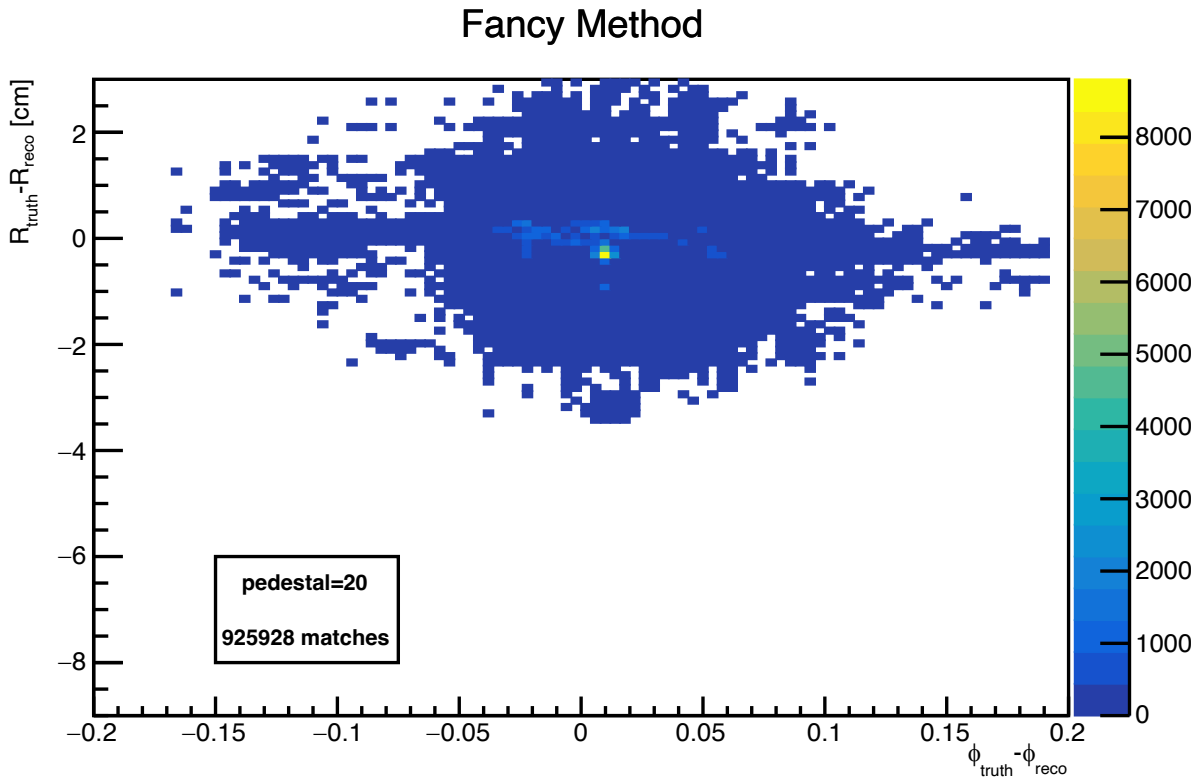
# Pedestal = 20

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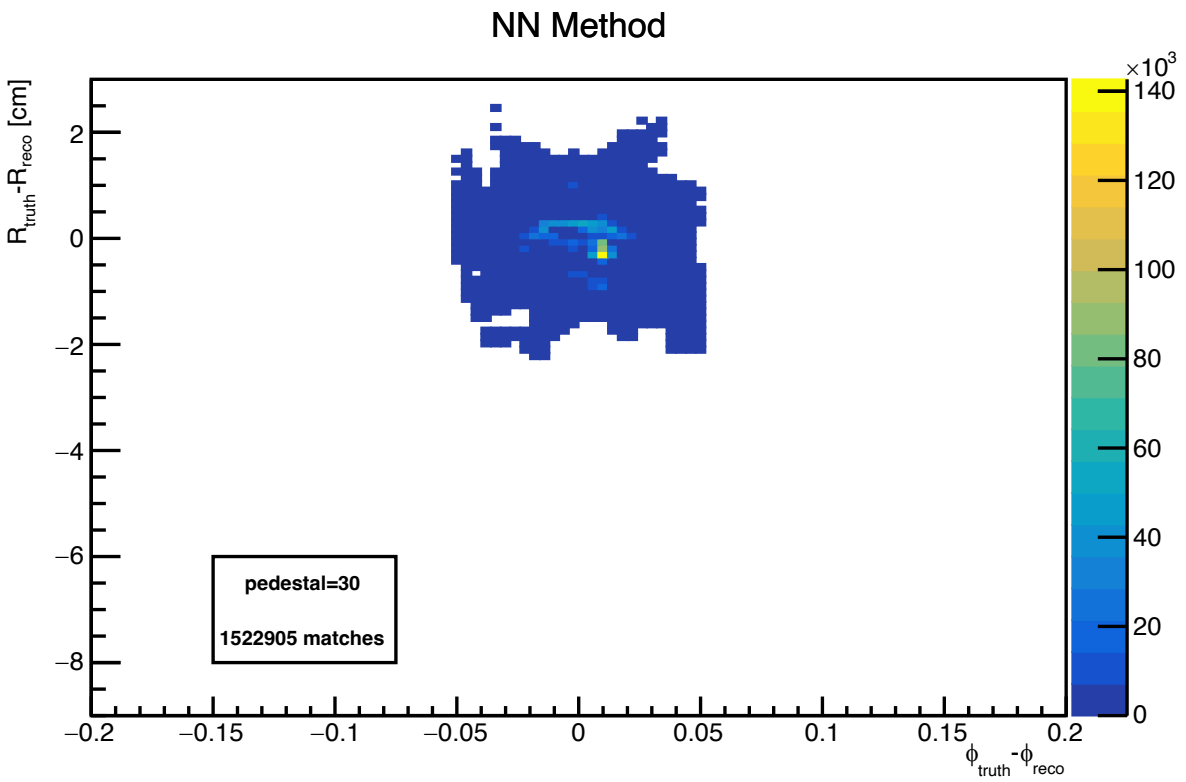
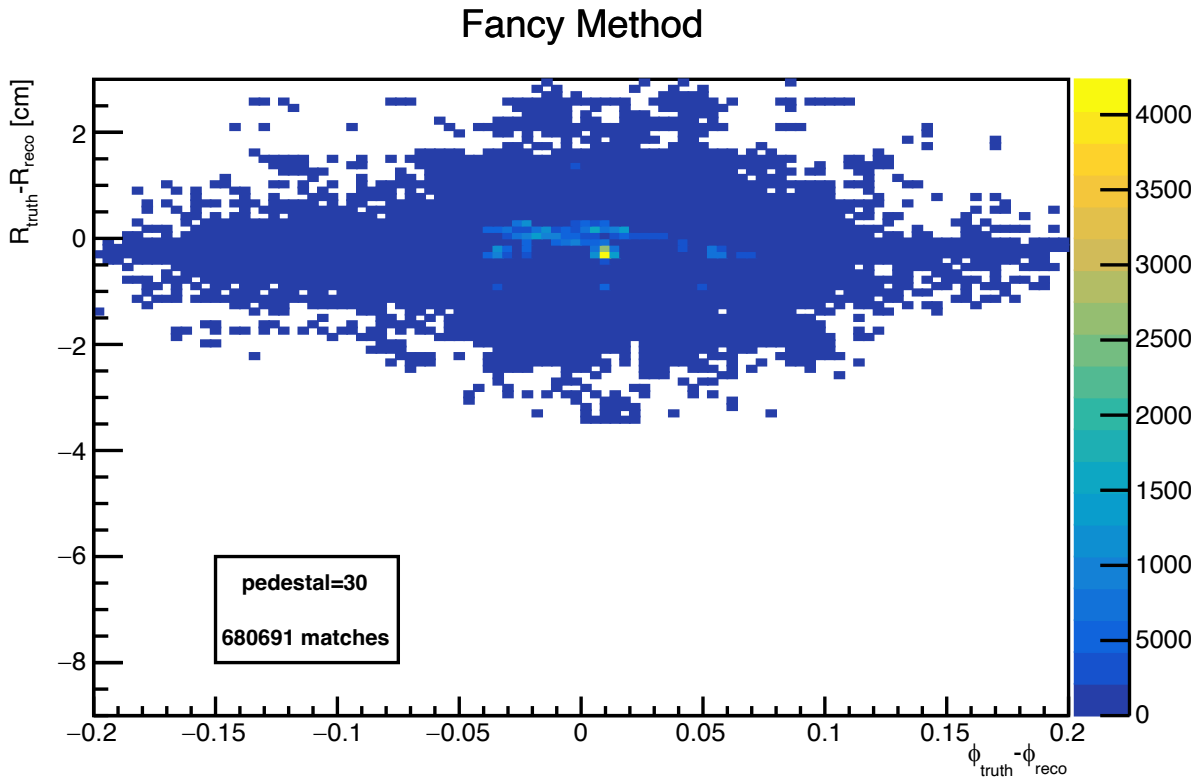
# Pedestal = 30

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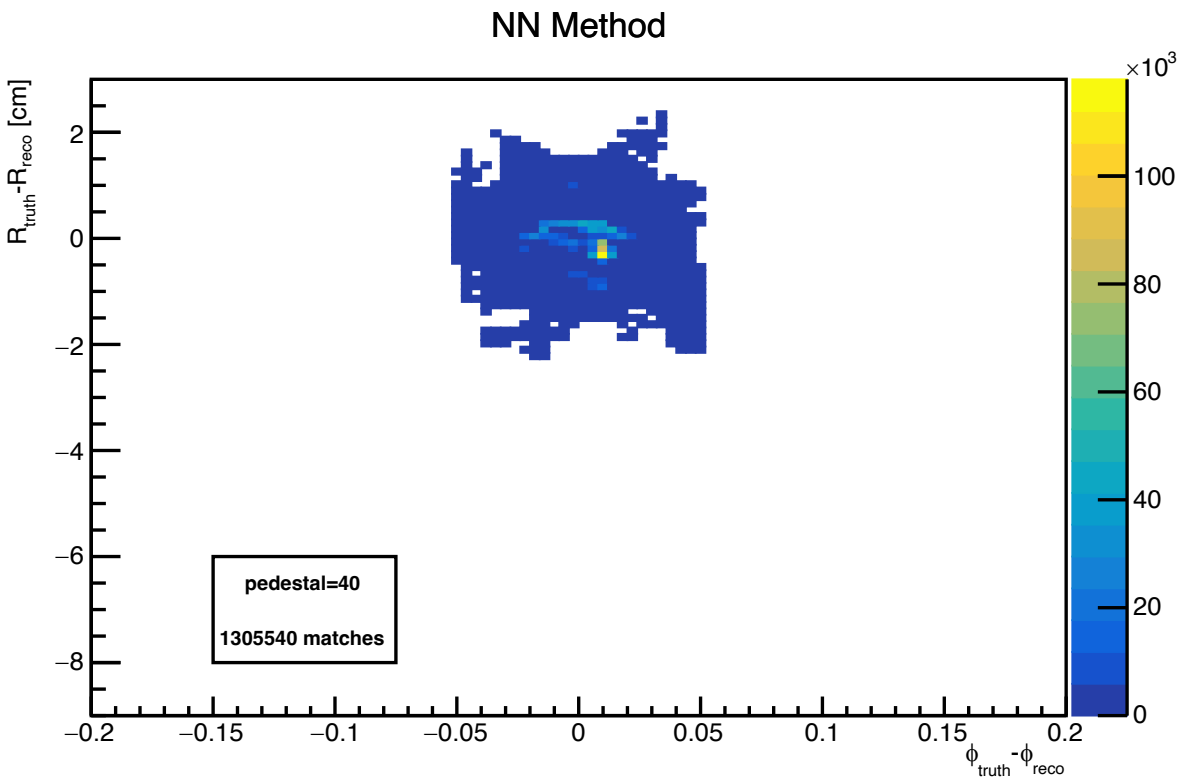
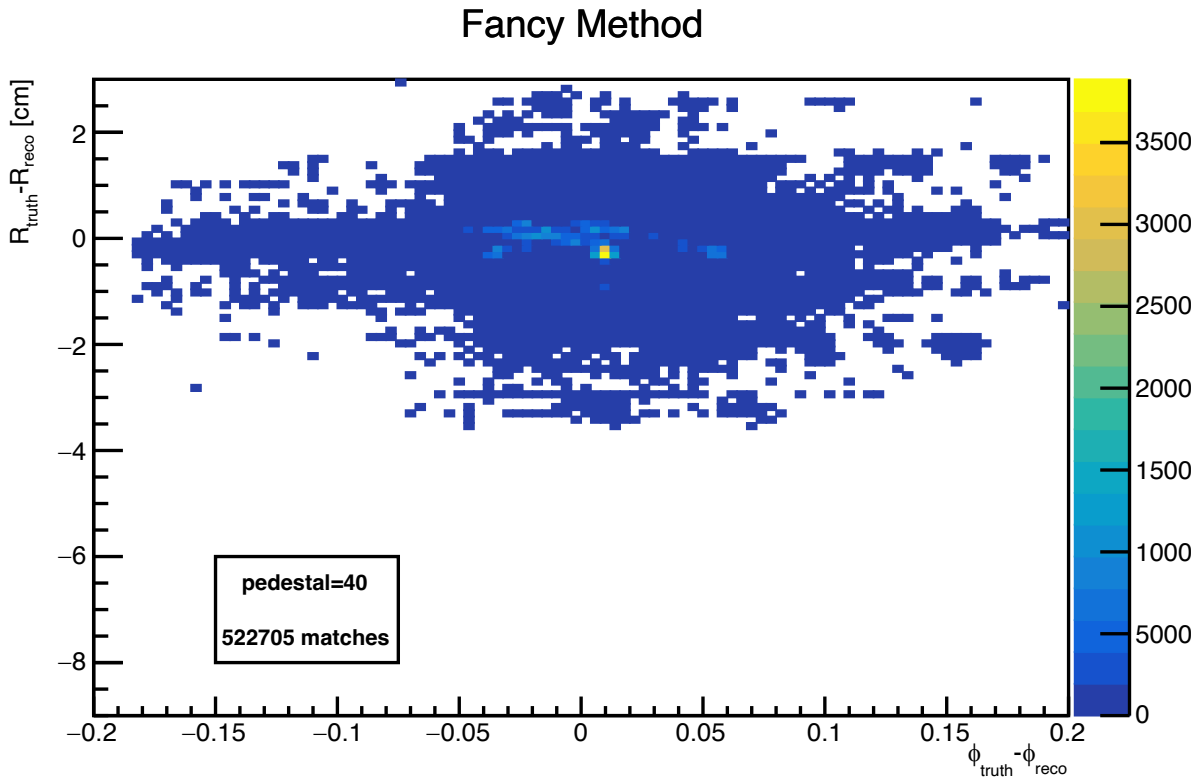
# Pedestal = 40

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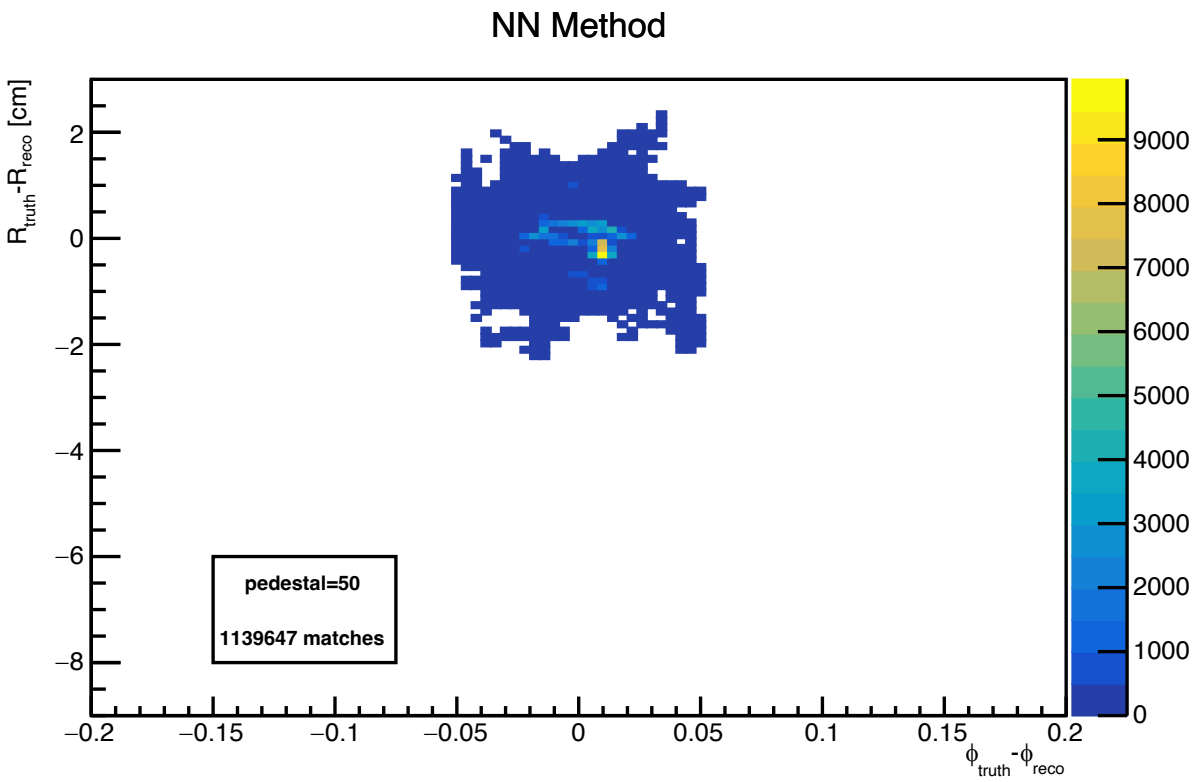
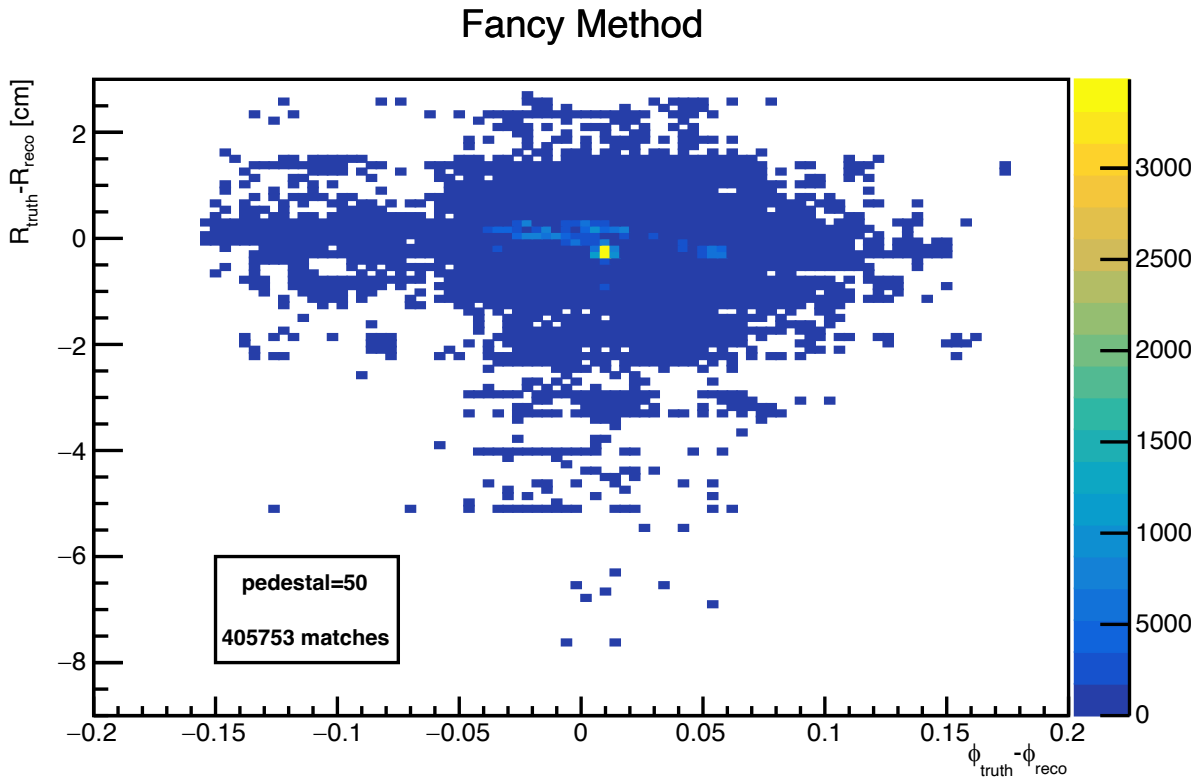
# Pedestal = 50

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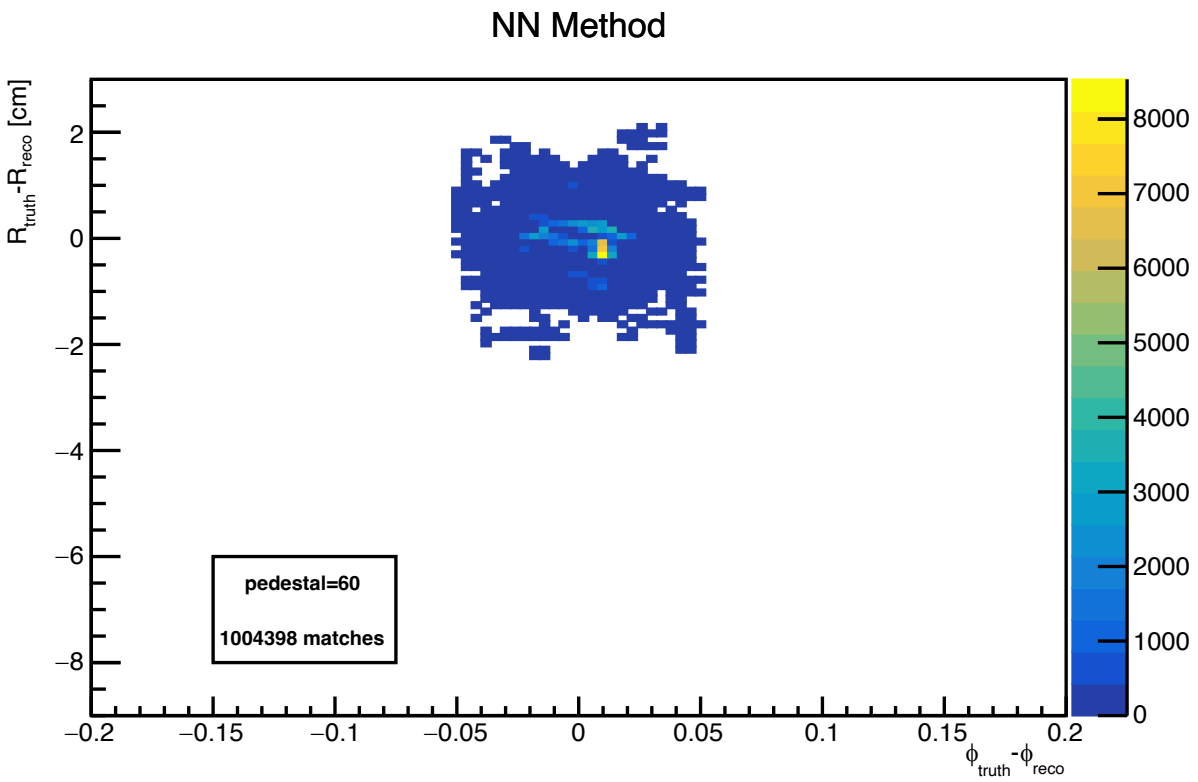
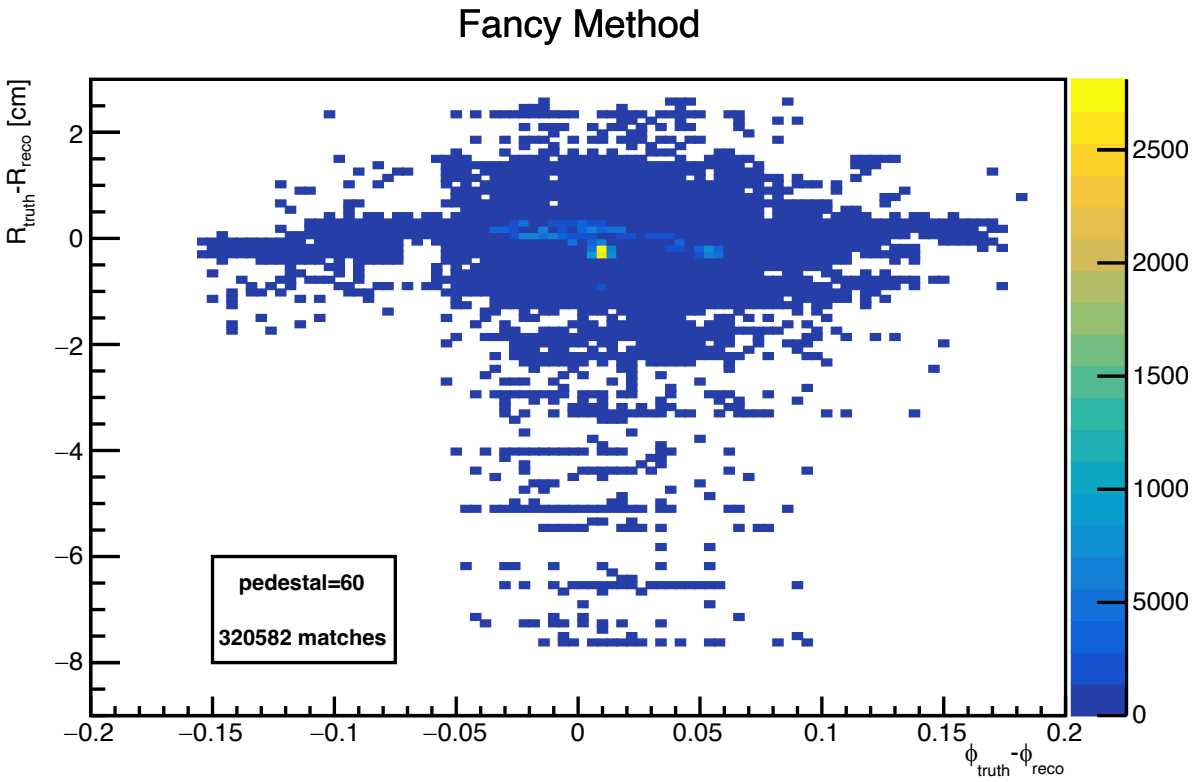
# Pedestal = 60

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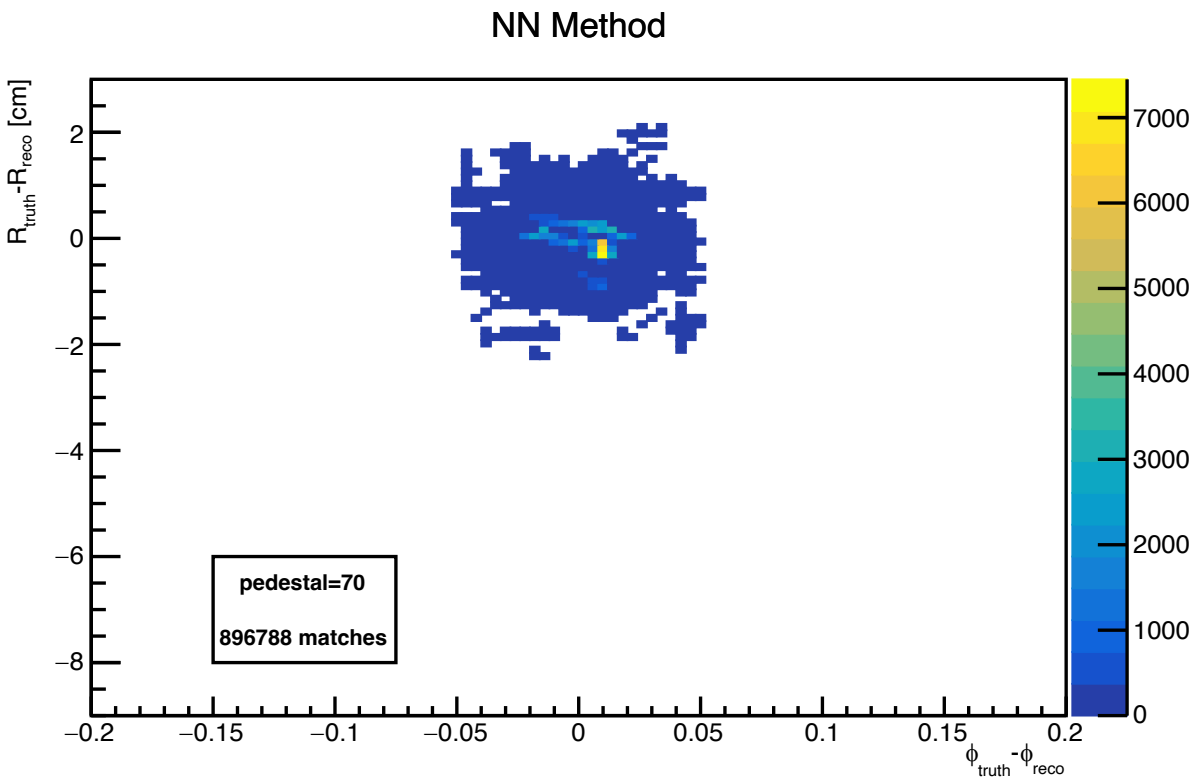
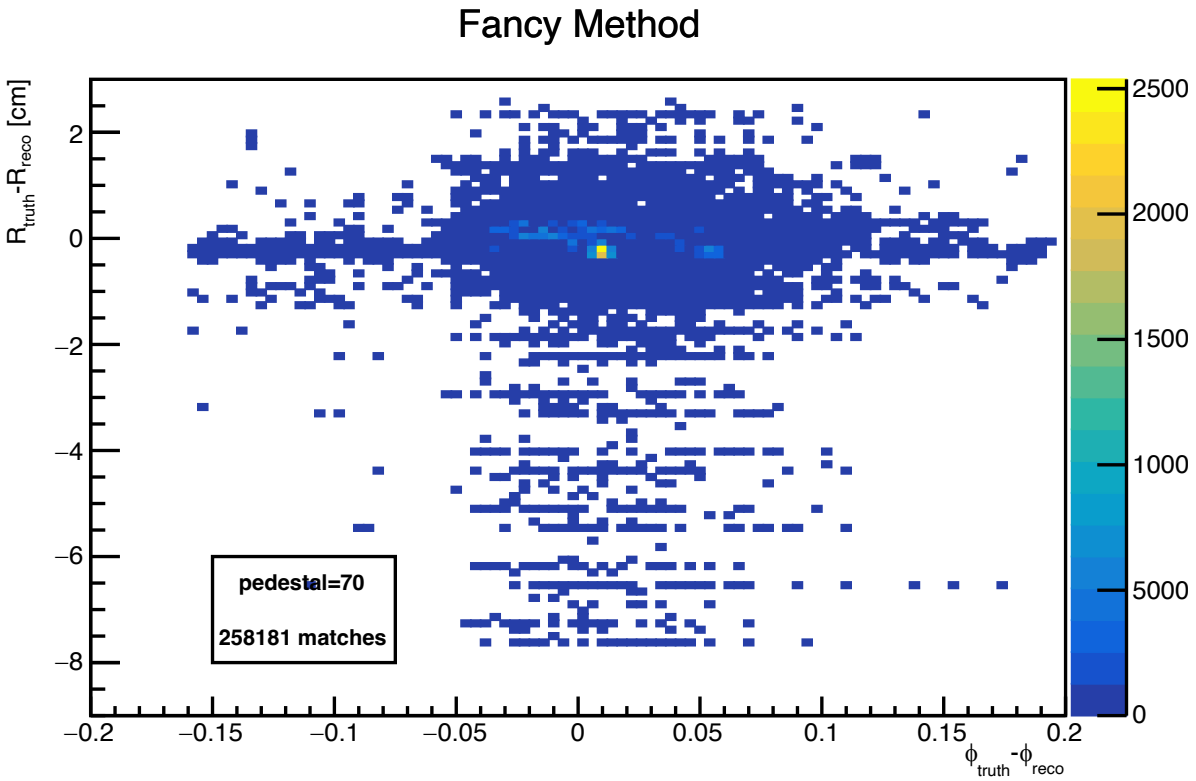
# Pedestal = 70

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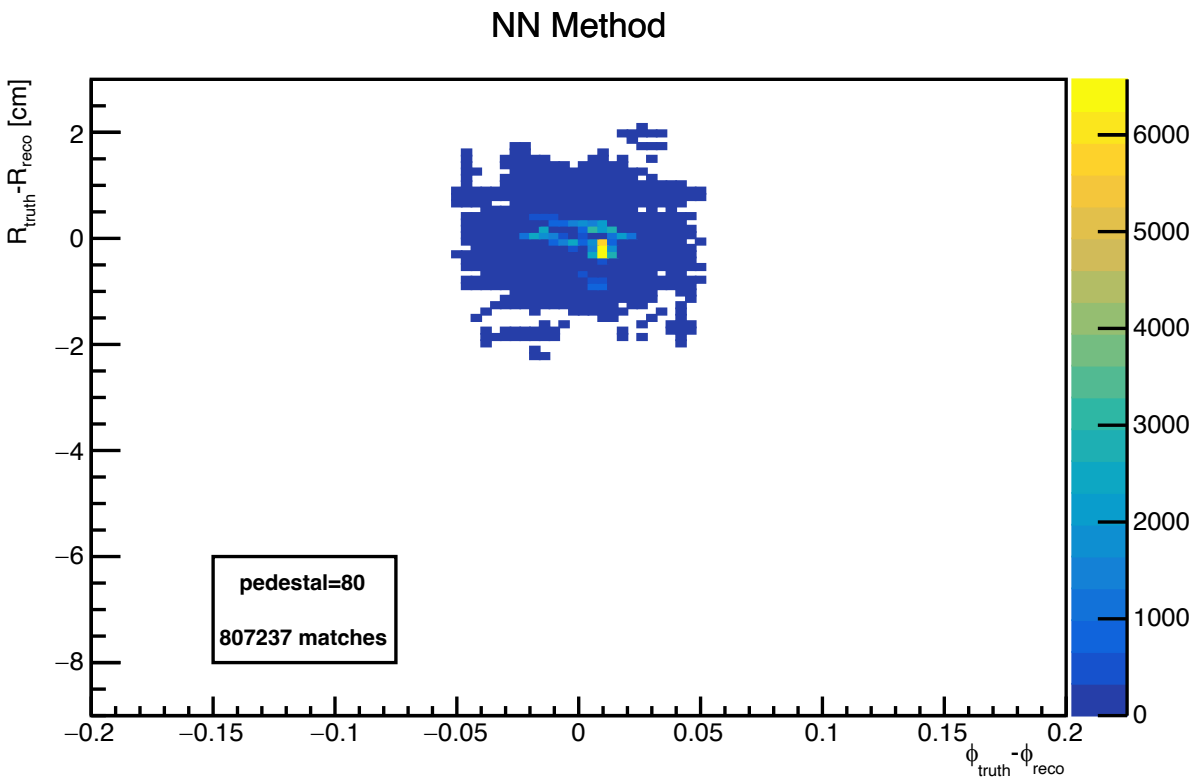
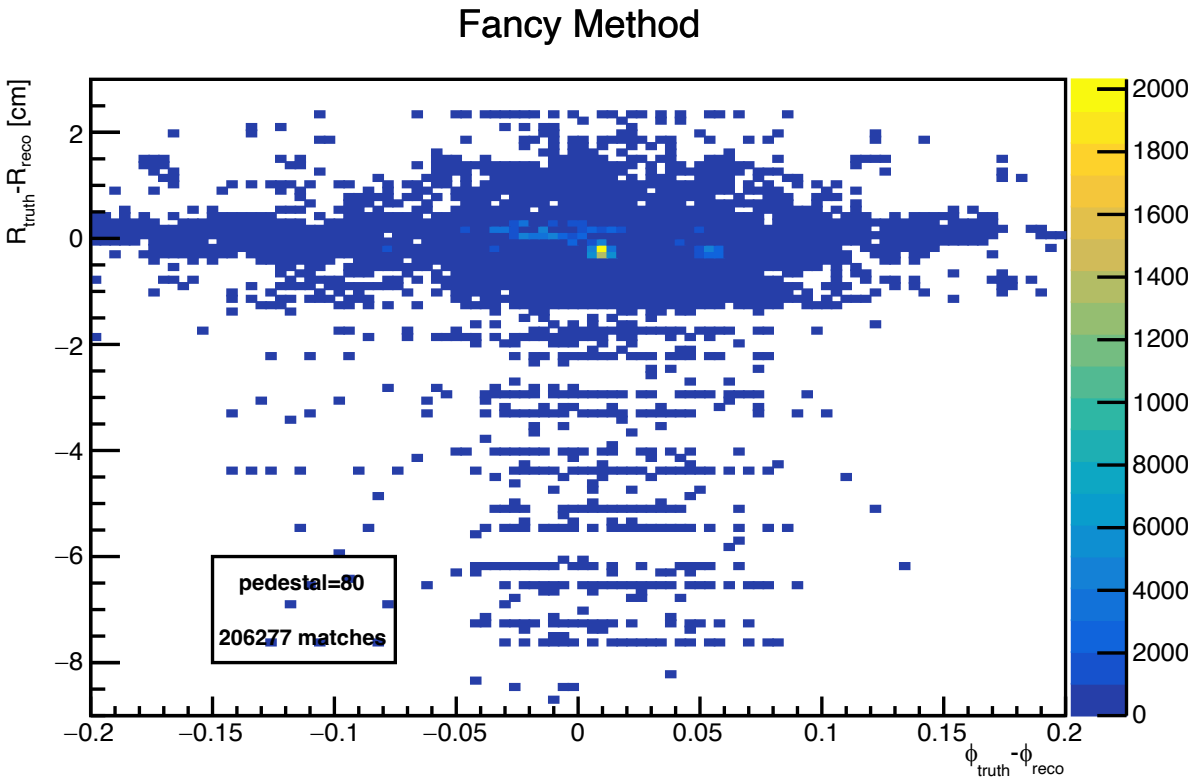
# Pedestal = 80

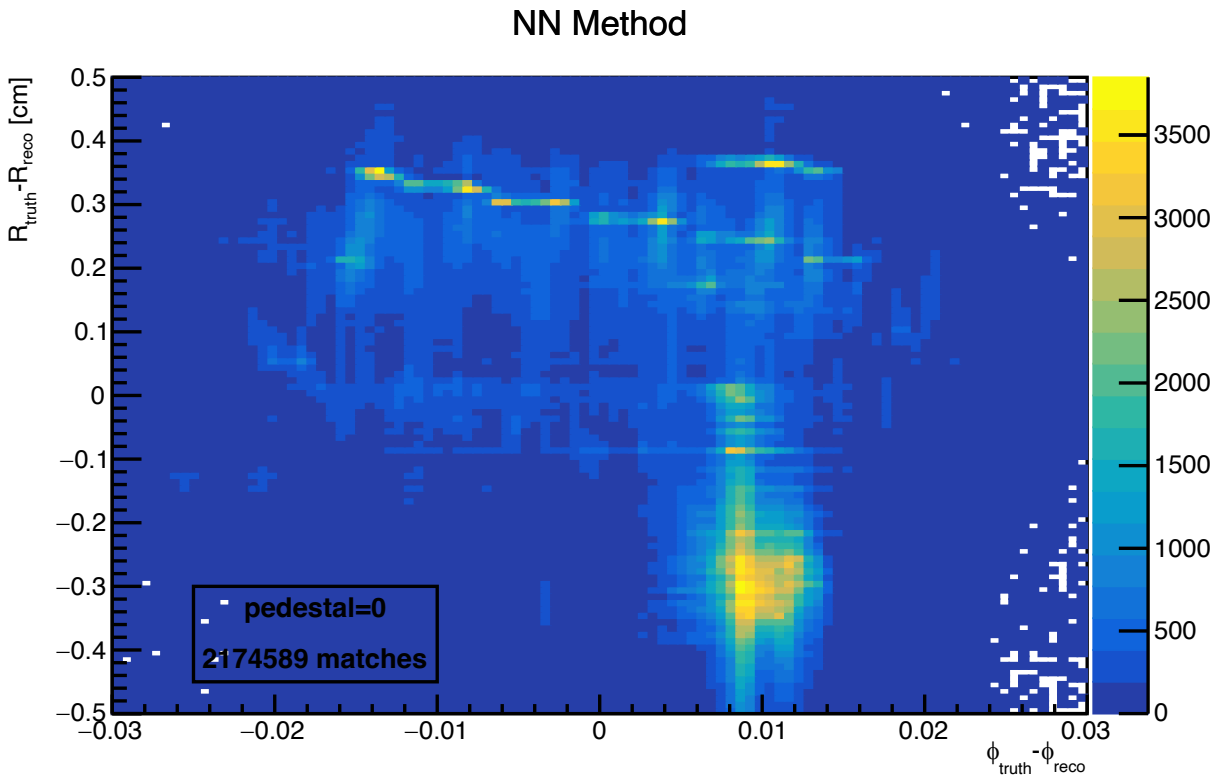


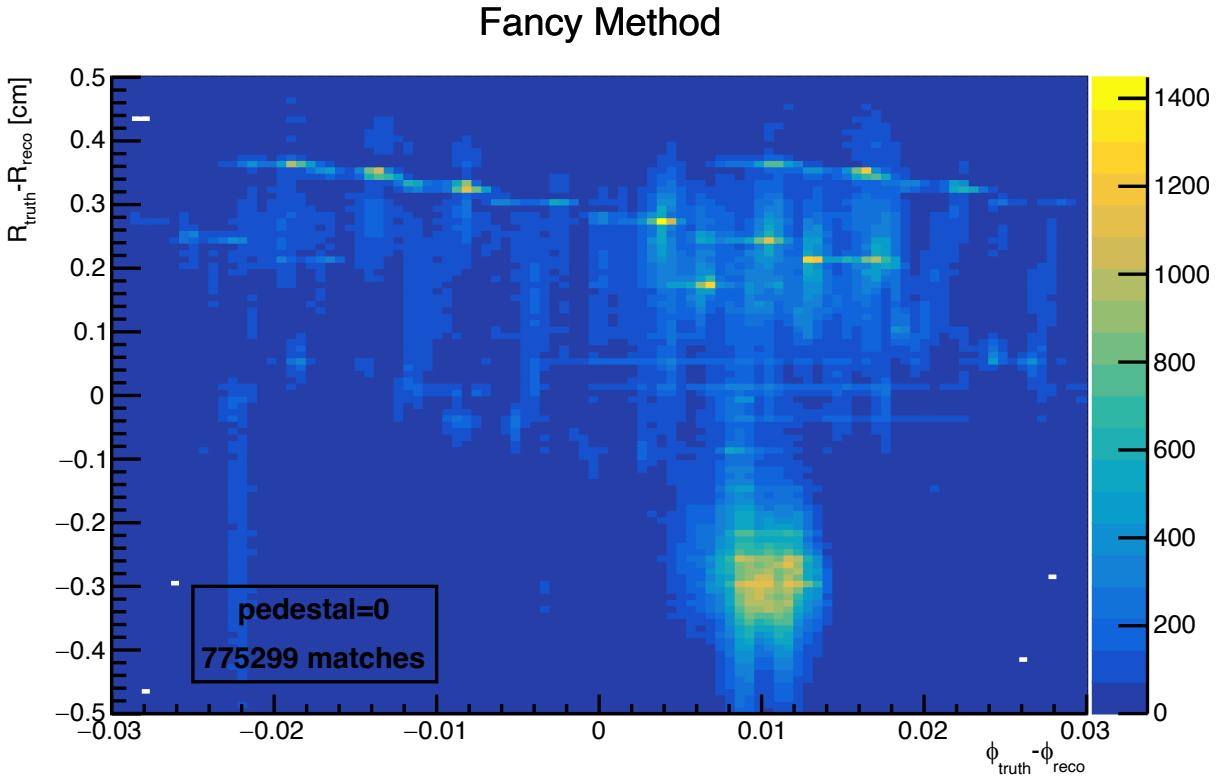




NN has more matches than fancy method and is tighter distribution

# What about just the bright spot?

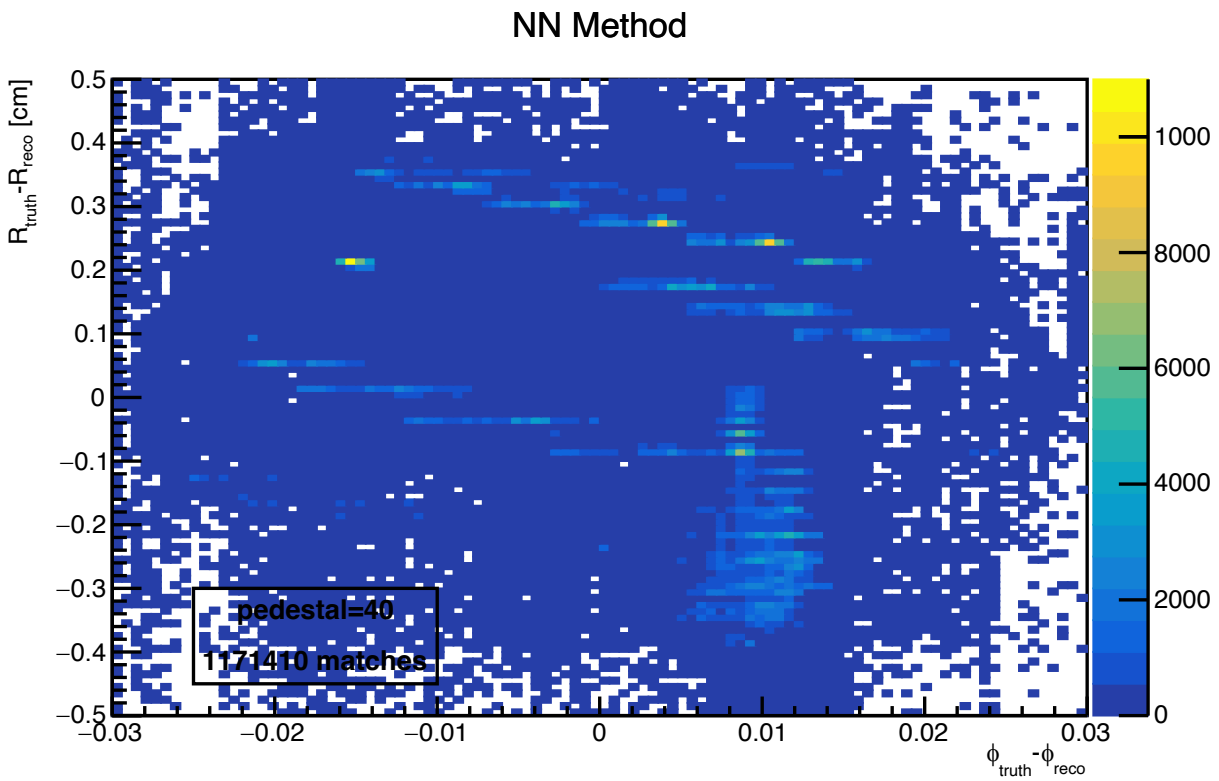
# Pedestal = 0

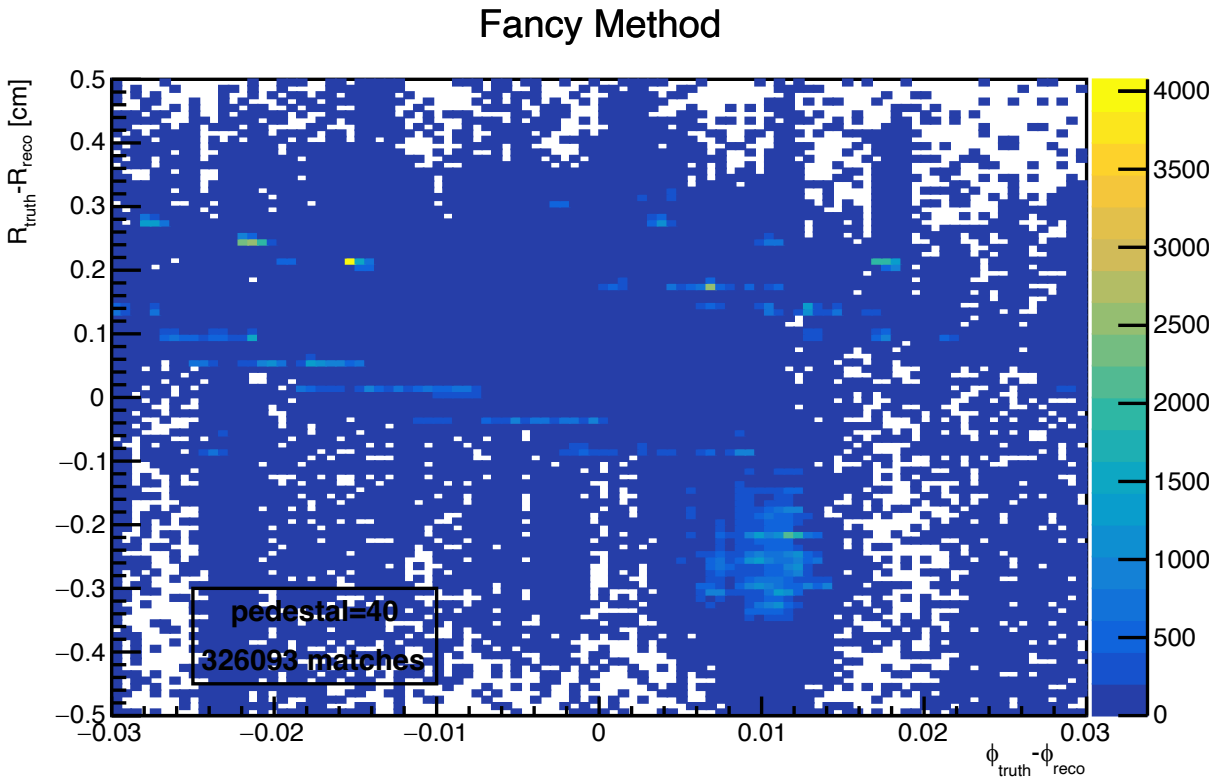



NN has more matches than fancy method but both are qualitatively similar

# Pedestal = 40

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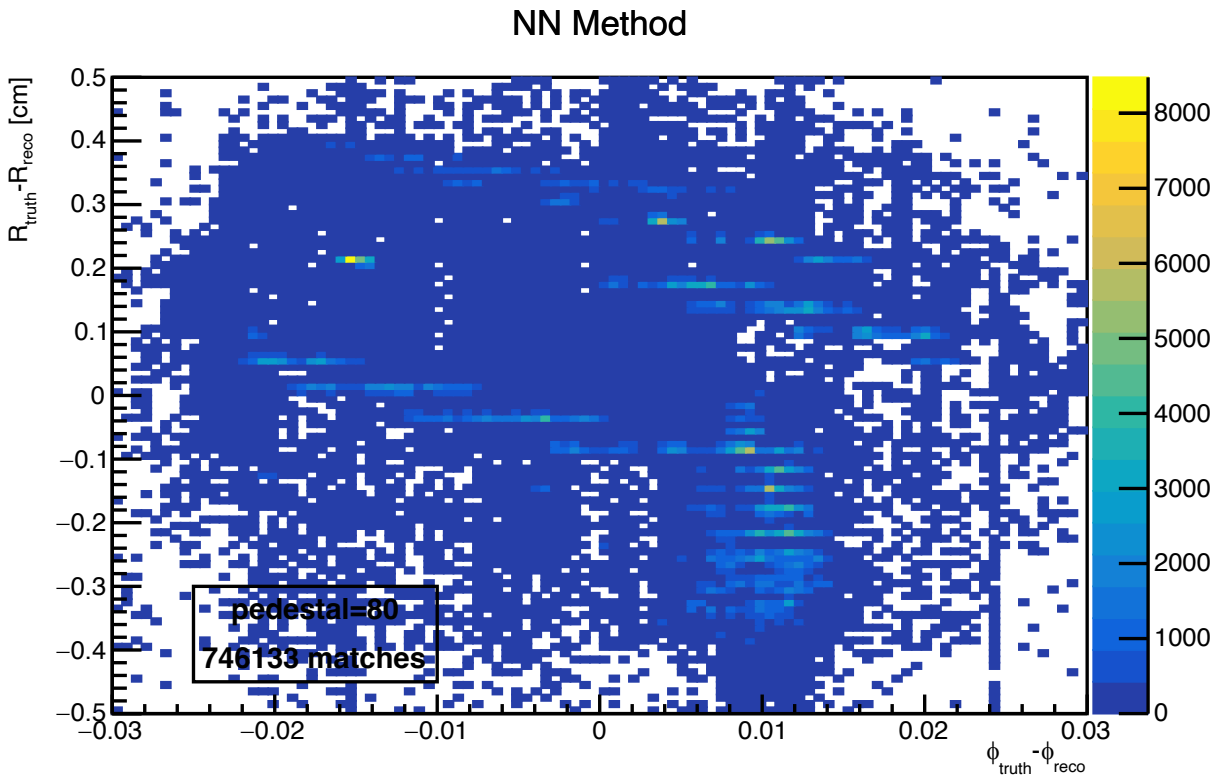
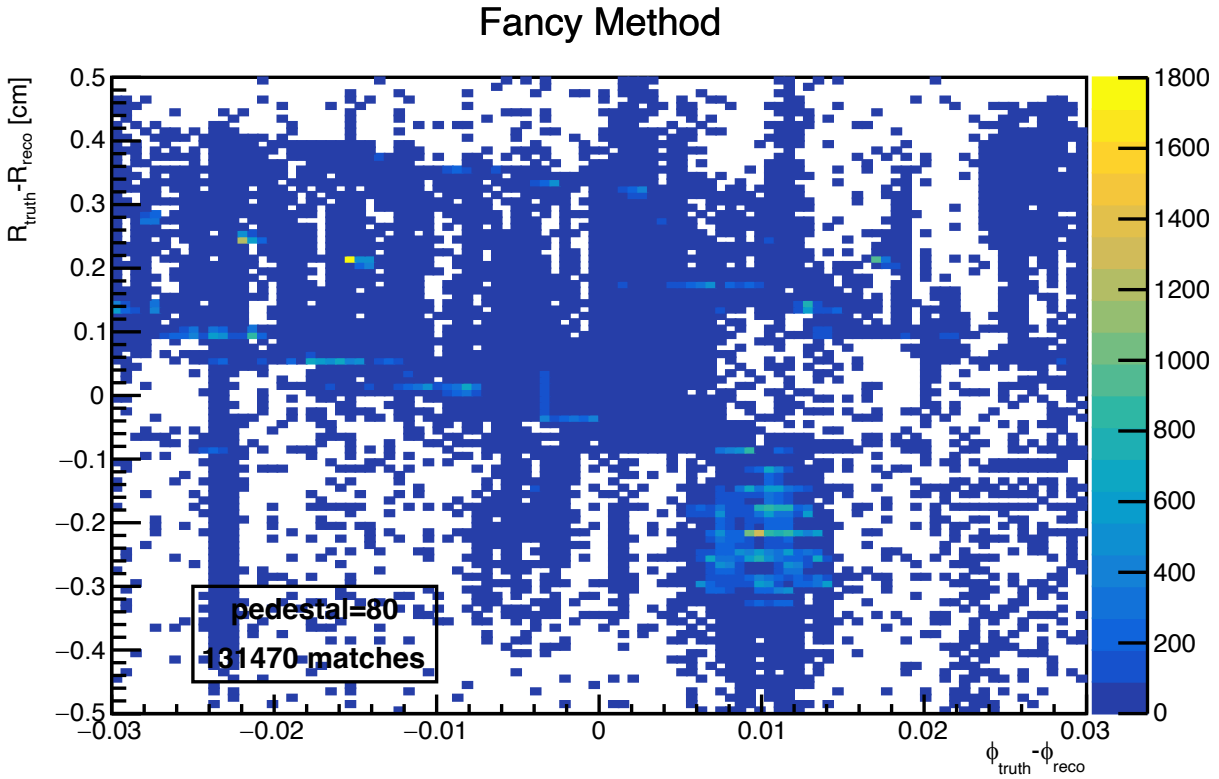
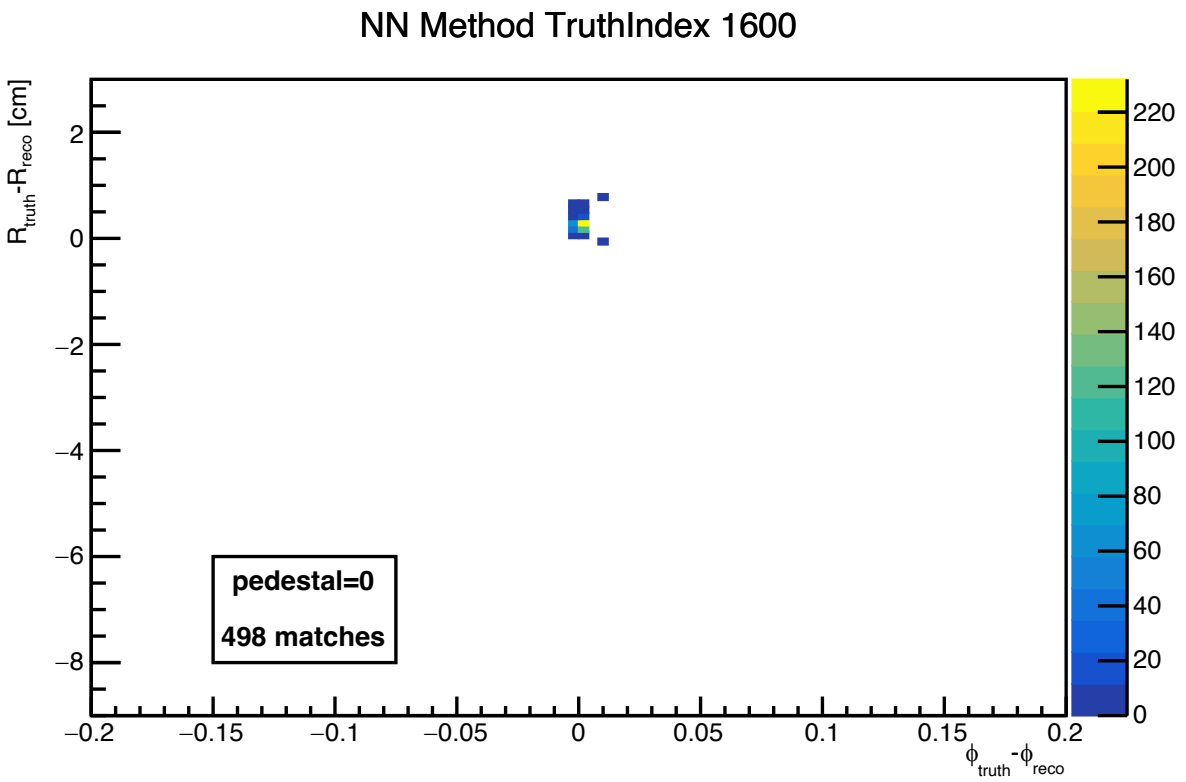


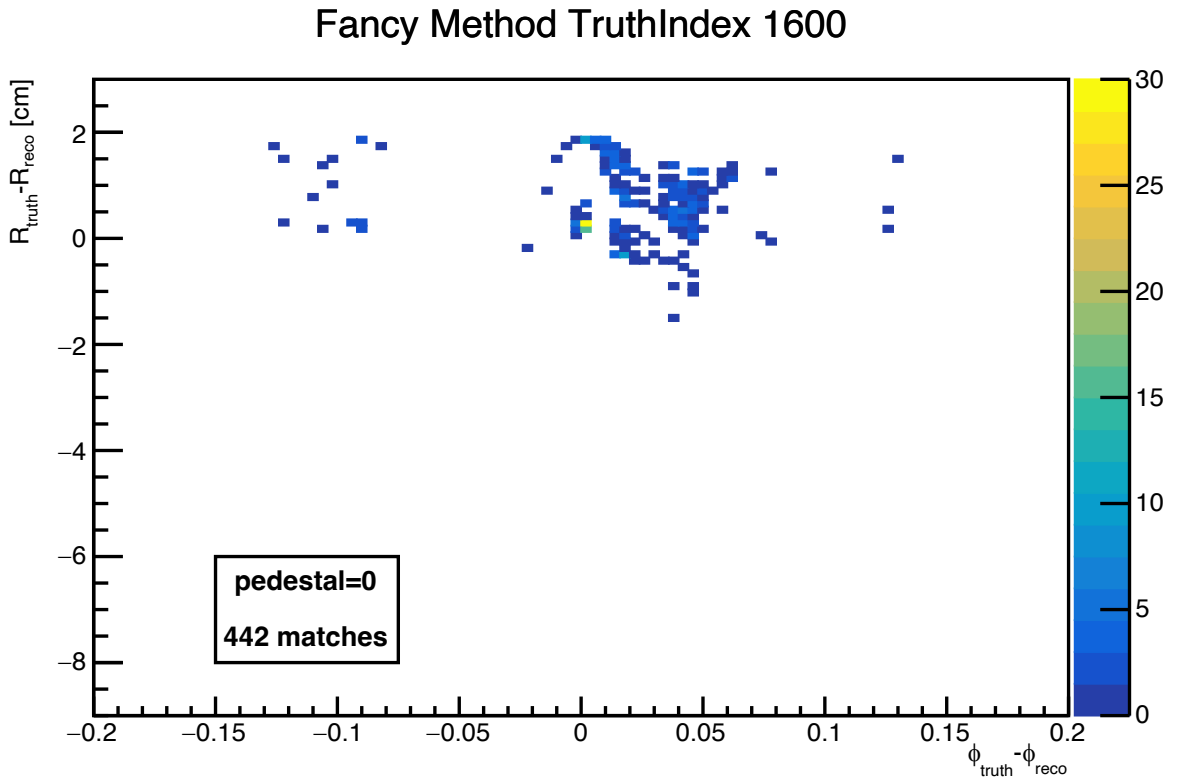




NN has more matches than fancy method but both are qualitatively similar

# How about for a single truth position?

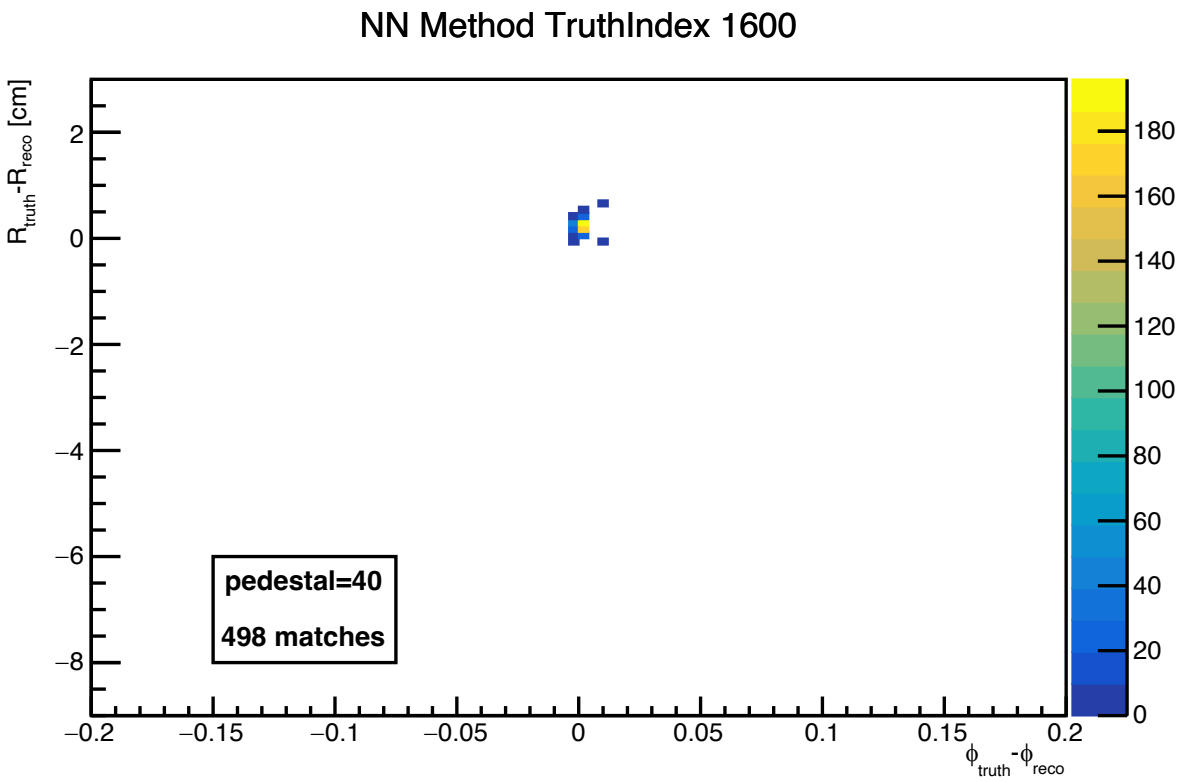
# Pedestal = 0

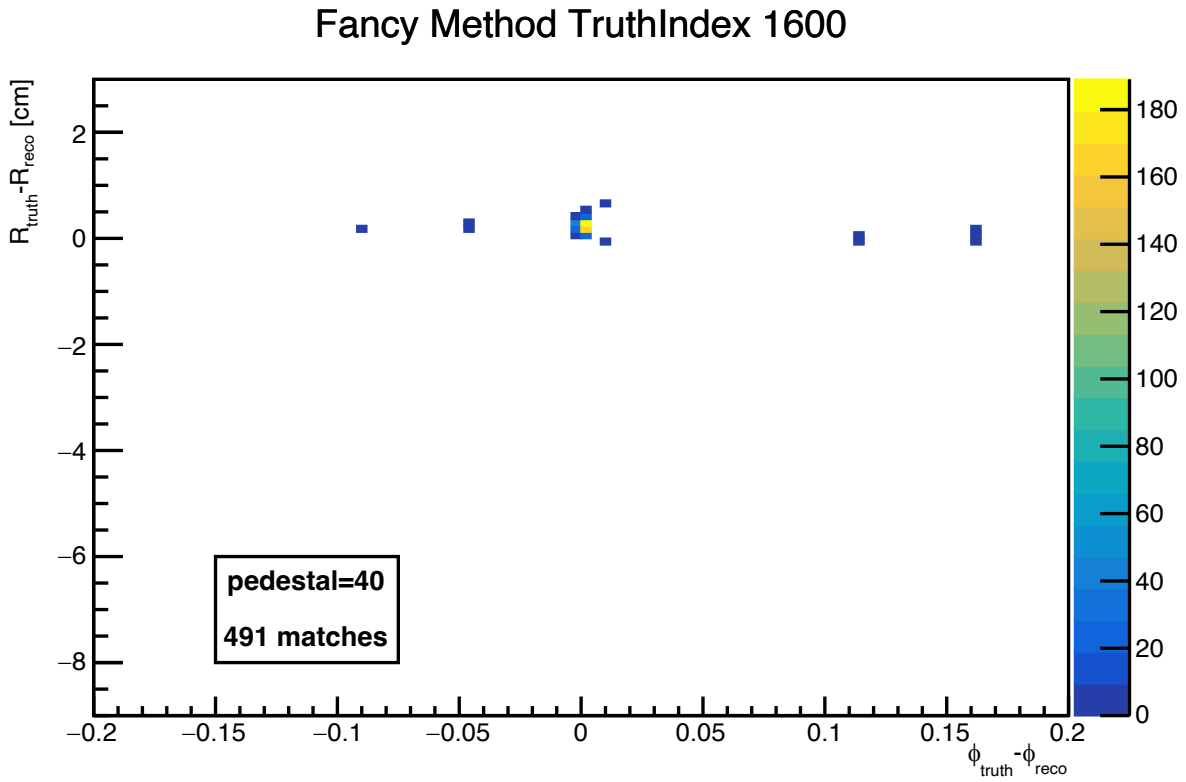



NN is much tighter than fancy method

# Pedestal = 40

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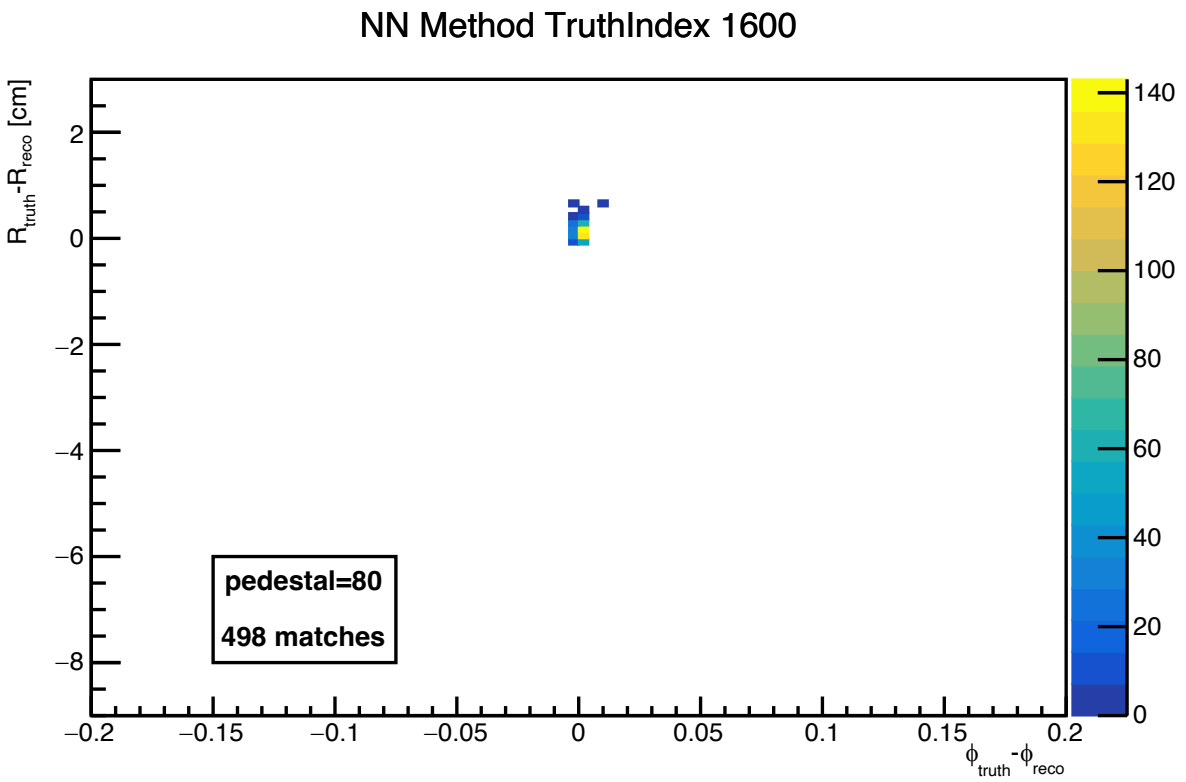


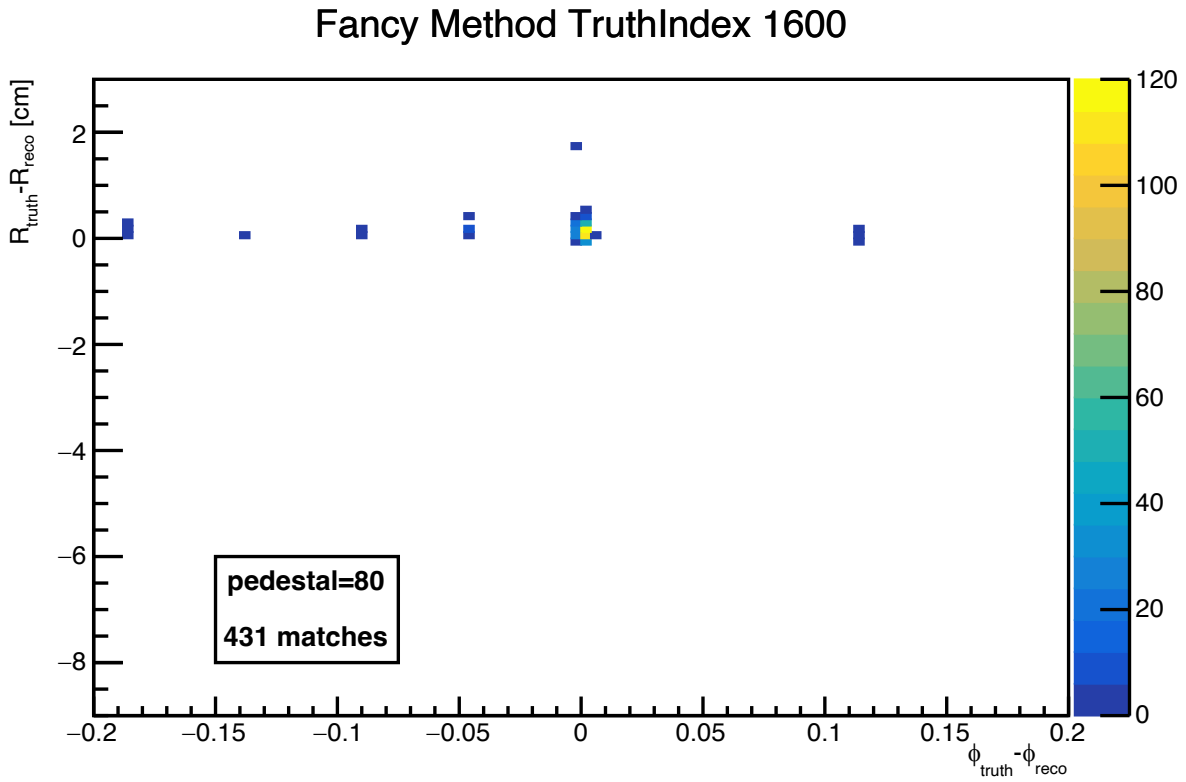


NN is much tighter than fancy method

# Conclusions

- Clear that NN matching performs consistently better than fancy method
  - More matched clusters
  - Tighter distribution
- Should change nominal matching to NN method