Recovering jets in dead LAr region

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Jet/MissingEt Performance
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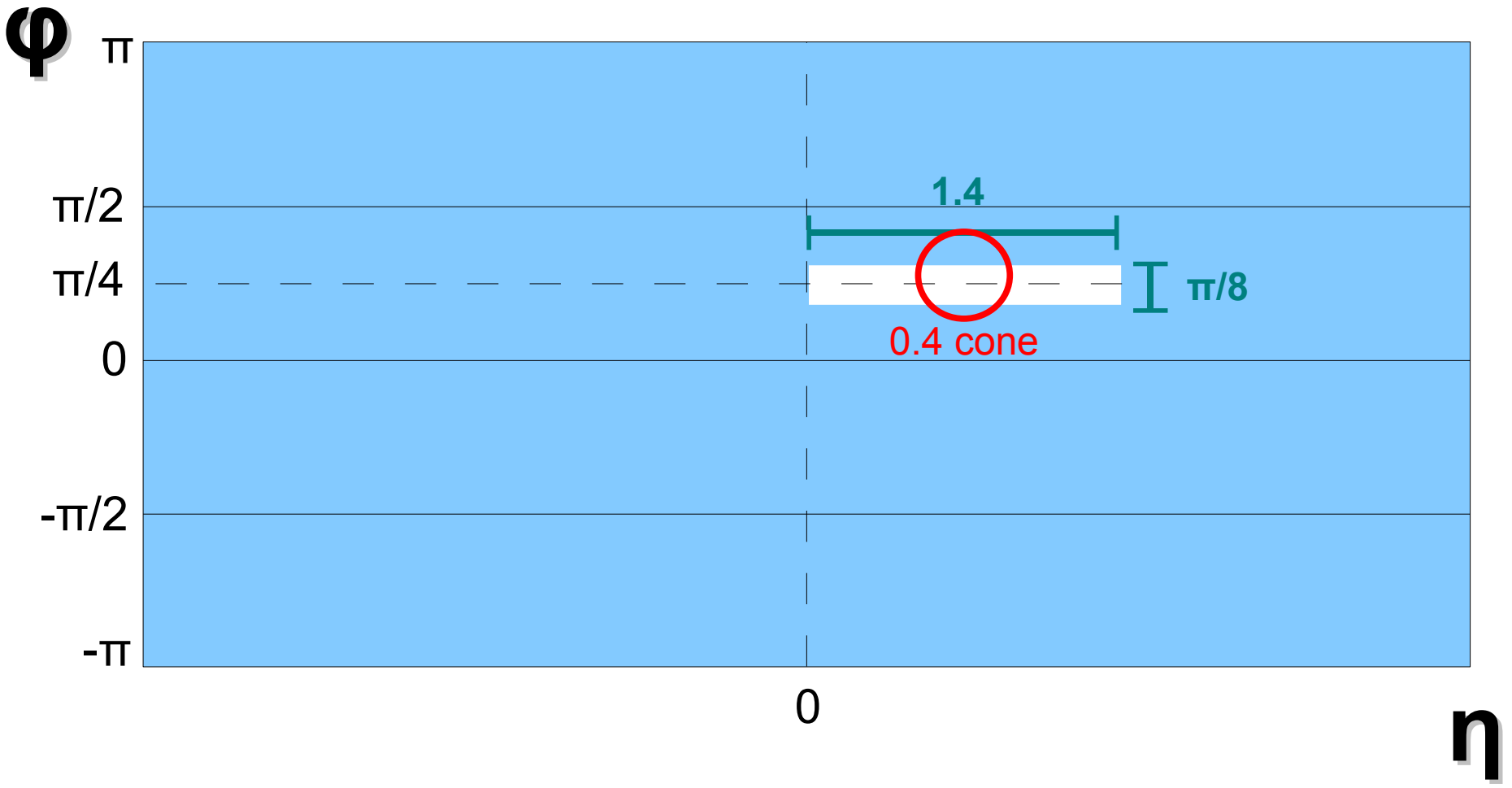
Overview

- There is a gap in LAr.
- We will recover jets from the hole, with any information left:
  - Tracks, TileCal, remaining LAr
- Benefits:
  - Jets of poorer resolution (better than nothing).
  - Reduced MET bias

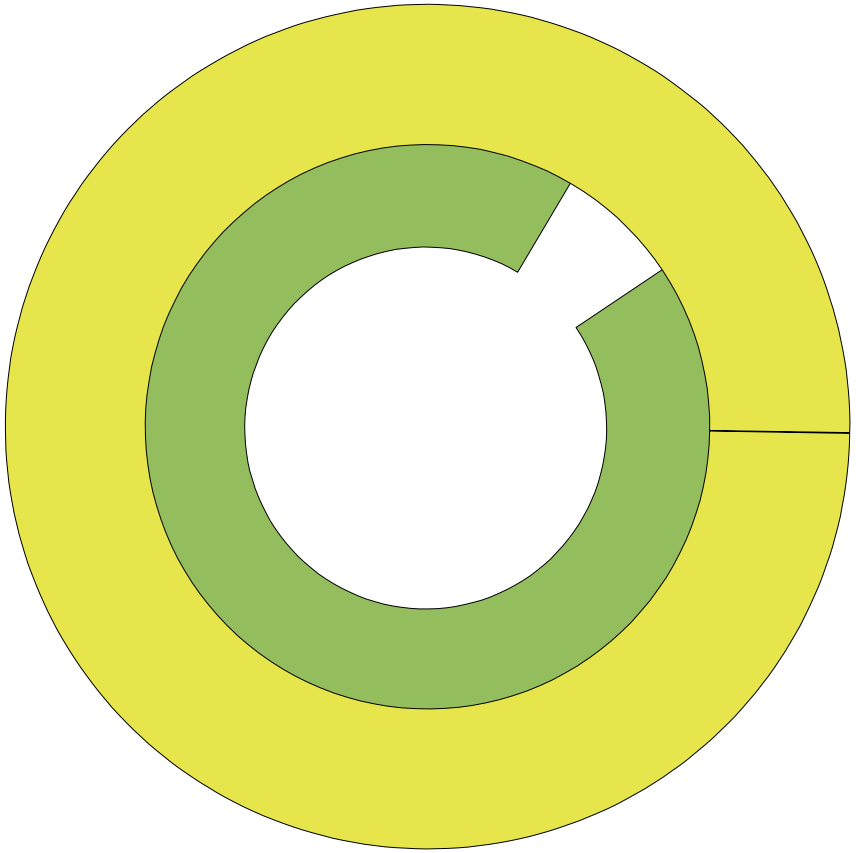
How big is the LAr gap?



Big gap → Many events affected.
Throwing them away = significant loss.

Expected problems

- Jets missed
- Fake MET
- Bias in MET φ-direction



Information to exploit

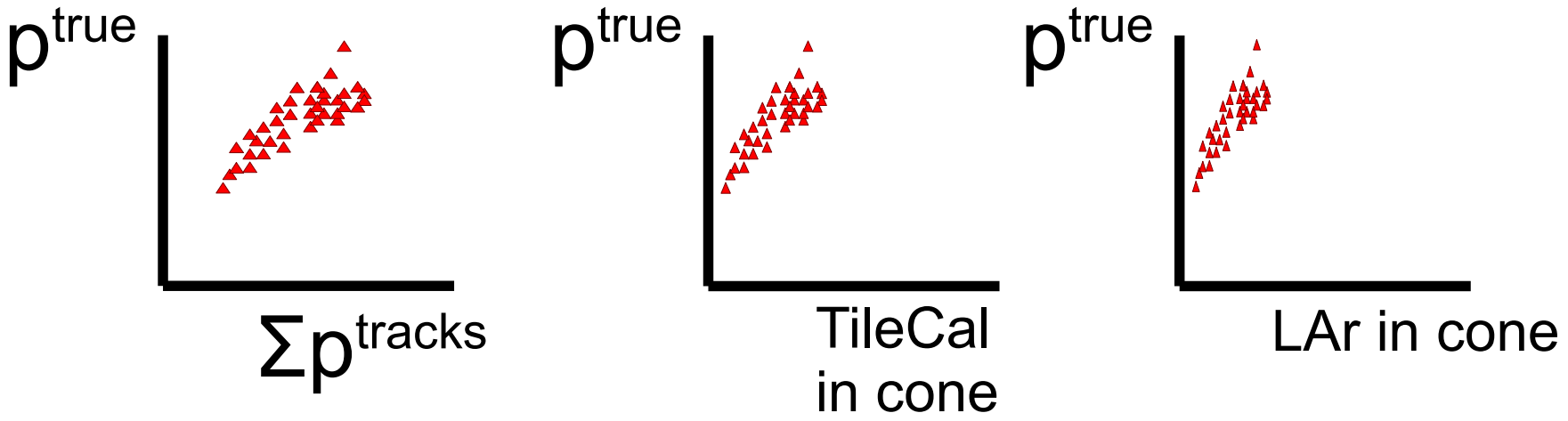
After making jets with Cone algorithm on tracks:

- Σp^{tracks} in the cone
- TileCal energy from cells in the cone
- Any LAr energy available in the cone.
- There may be more useful variables, like density of tracks etc.

- That should all be available in AOD.

How we will do this

- Find track jets (Cone algorithm).
- Partition them in bins of {η,φ}.
- For each bin:
- Draw the following scatter plots (maybe more):



- Multivariate regression to guess p^{true} given the observables.
  - $p^{\text{guess of true}}_{\{bin\}}(\Sigma p_{tracks}, \text{TileCal}, \text{LAr}, \ldots)$

What we have in the end

- A recipe:
  - Start from tracks, using cone algorithm.
  - What direction? Aha... so you are in *that* bin.
  - Use the corresponding function:
    - $p^{\text{guess of true}}_{\{bin\}}(\Sigma p^{\text{tracks}}, \text{TileCal, LAr, ...})$

Practical Considerations

- Keep regular clustering and calibrations, if jets are far from the hole.
- Just for the region near the hole, use our recipe.

- AOD can have these recovered jets as an additional container, with jets missing from other containers.

One step further

- Combine with *in situ* balance study.
  - In dijet and Z/γ+jet events, check if recovered jet p_T balances with the opposite side.
  - Derive appropriate correction for E of recovered jets.

Summary

- We are working on a calibration that will use any available information.
- That will be used to recover jets from the hole.
- Obviously important for doing physics with jets and MET in early data.