



Plug Shower Maximum: High Voltage, Photomultiplier Tubes & Reconstruction Software

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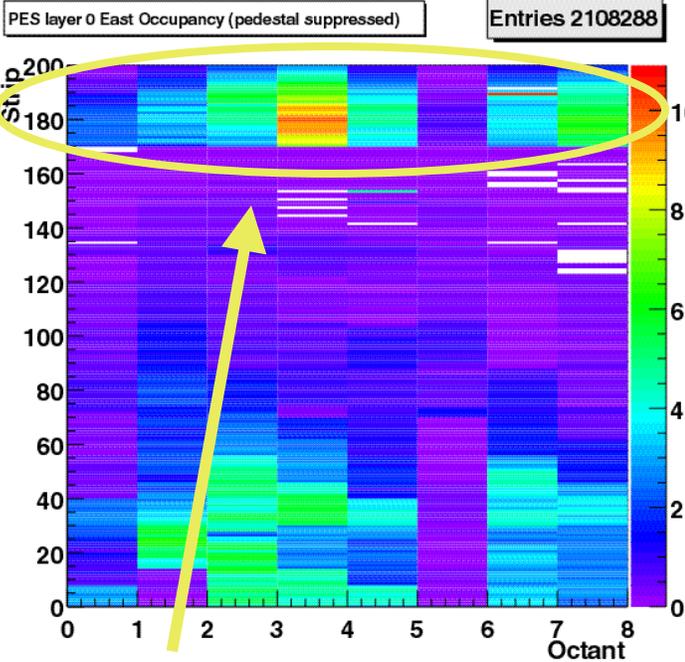
**University of California,
Los Angeles**

Outline:

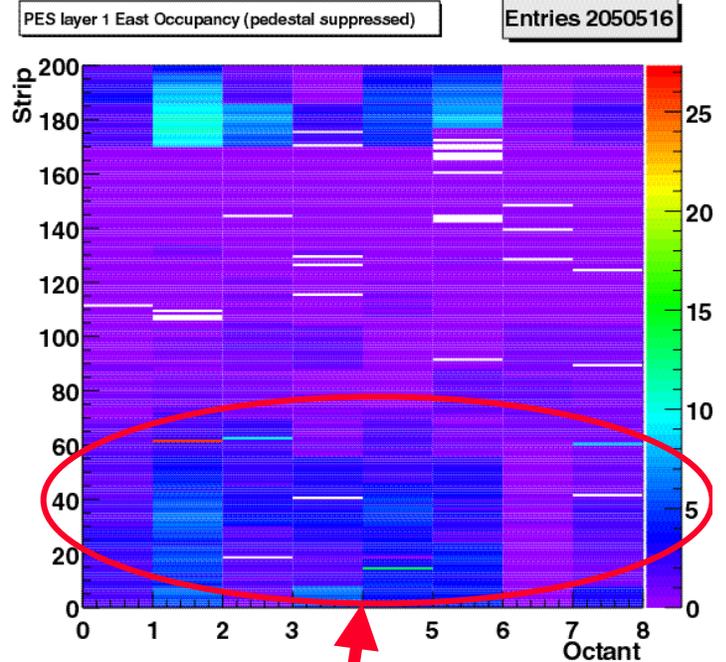
- **What works**
- **What's been fixed**
- **What's still broken**



Looking at 36x36 data

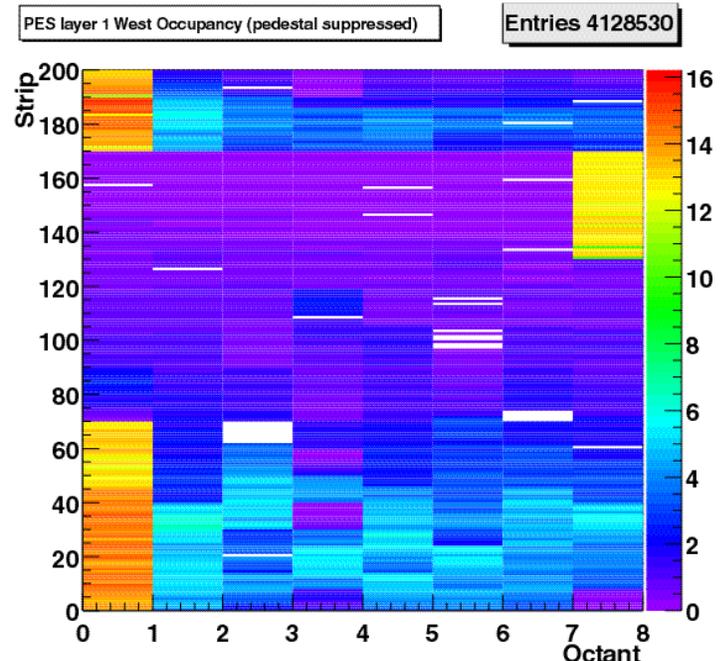
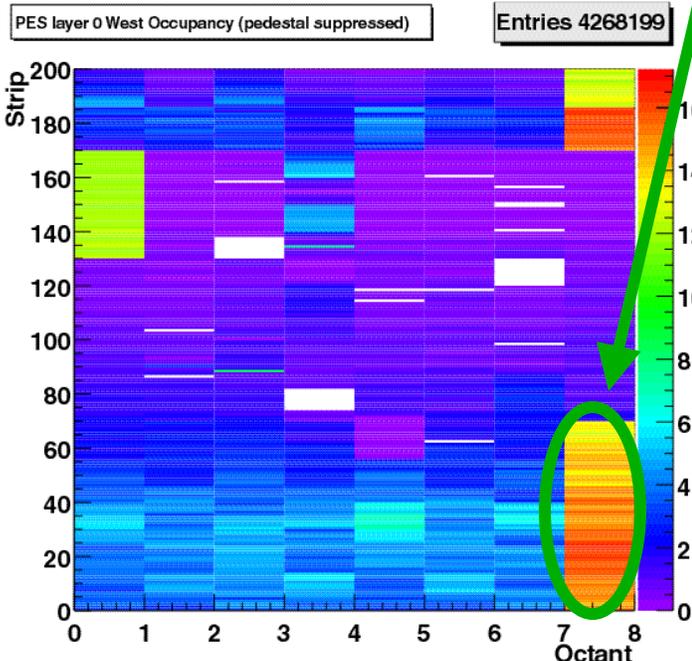


High eta strips



Long strips

Hot spots

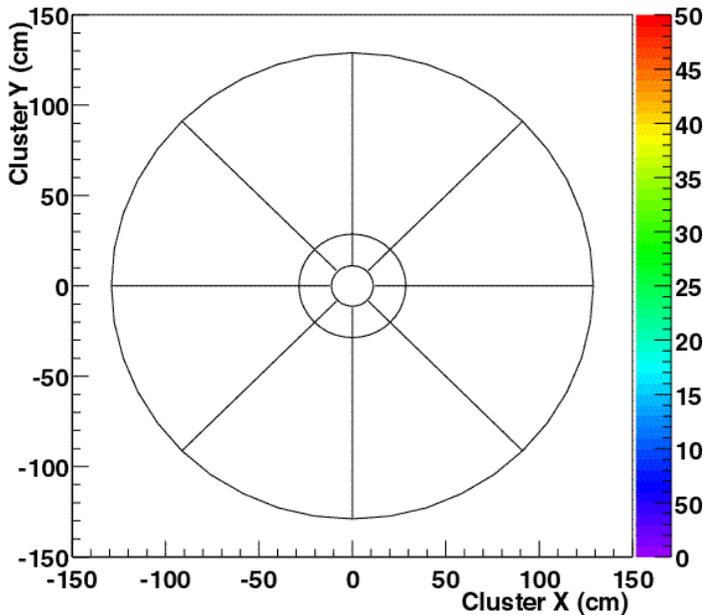




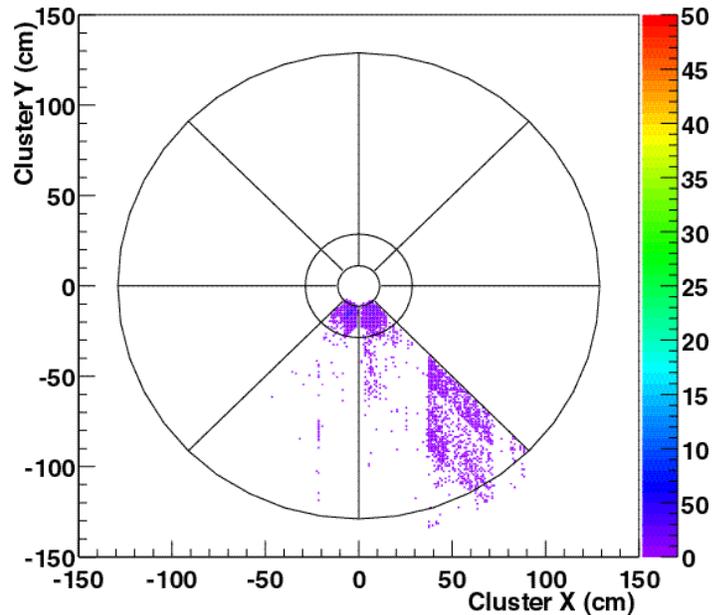
2d clusters

1x8 data: only had parts of 2 octants

Cluster X versus Cluster Y East PES

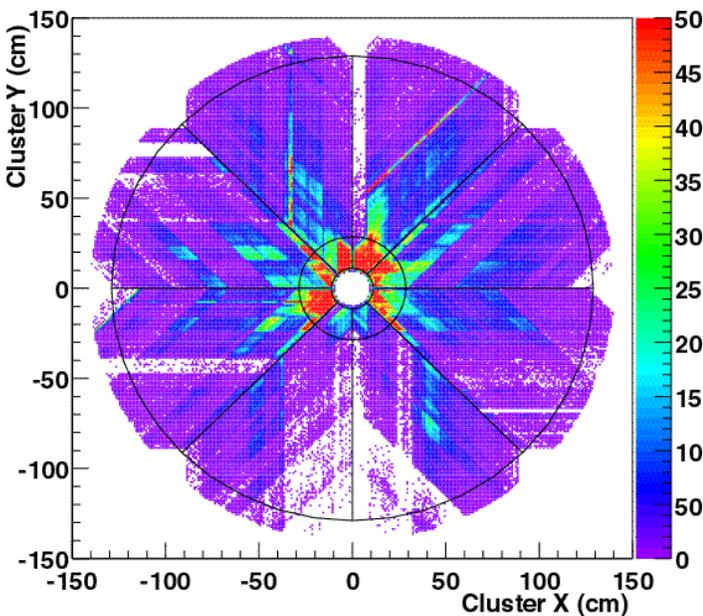


Cluster X versus Cluster Y West PES

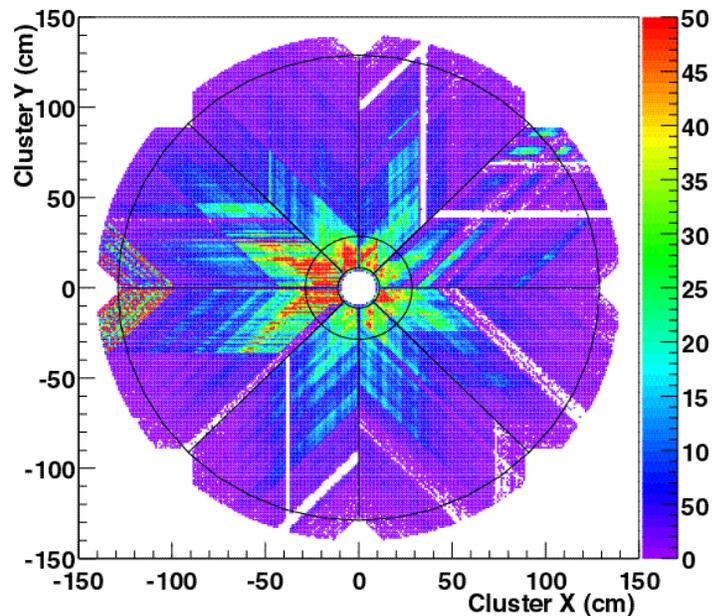


36x36 data: nearly entire PES works!

Cluster X versus Cluster Y East PES



Cluster X versus Cluster Y West PES





Comparing PES to PEM

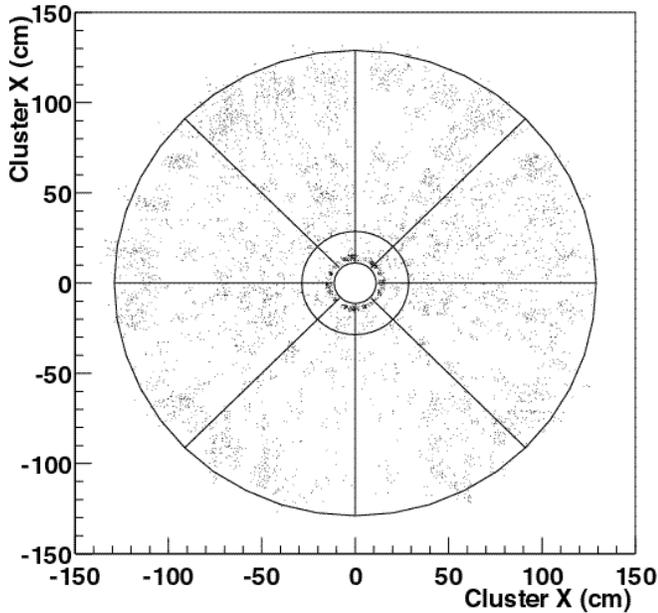
Had/EM < 0.1

Isolation < 4 GeV

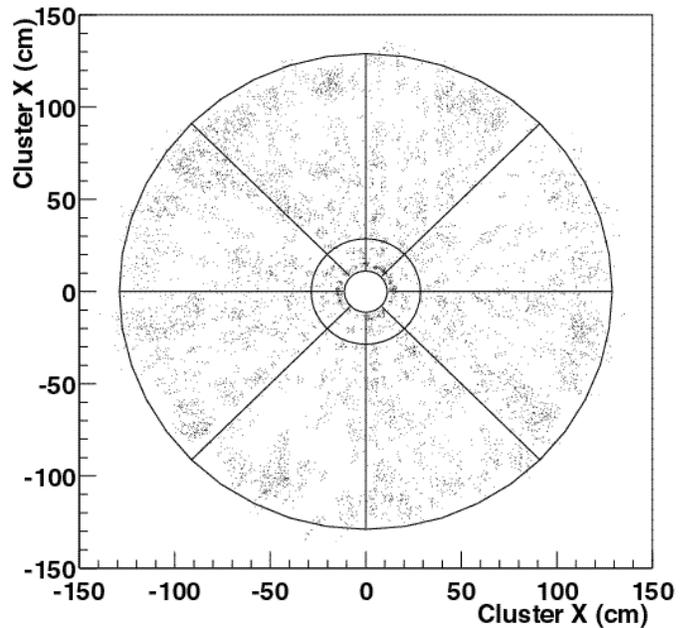
Either $\Delta\eta < 0.1$ or

$\Delta\phi < 0.1$

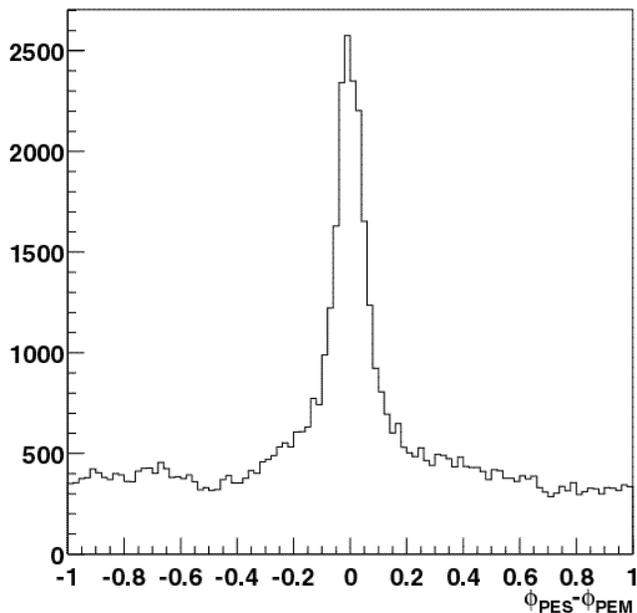
East PES



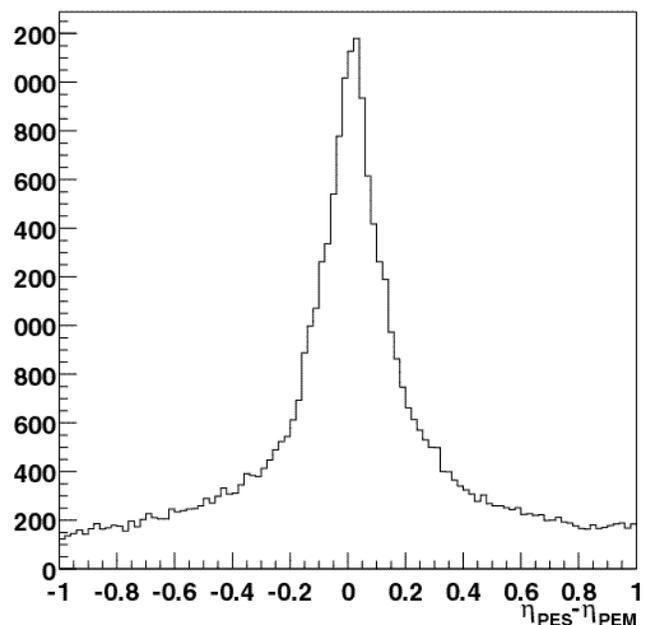
West PES



Phi resolution



Eta resolution





What's broken?

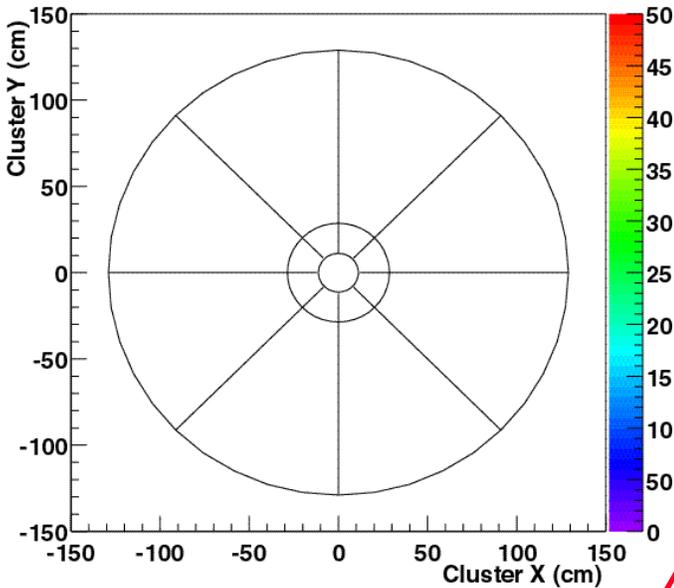
- **As seen on the previous plots, much of the PES is now working**
- **There are a few dead channels**
 - **To isolate dead channels, have looked at data and at source runs (see Martin von der Mey's talk)**
- **There are also a few hot channels**
 - **To isolate hot channels, take cosmic runs with high voltage on and off**



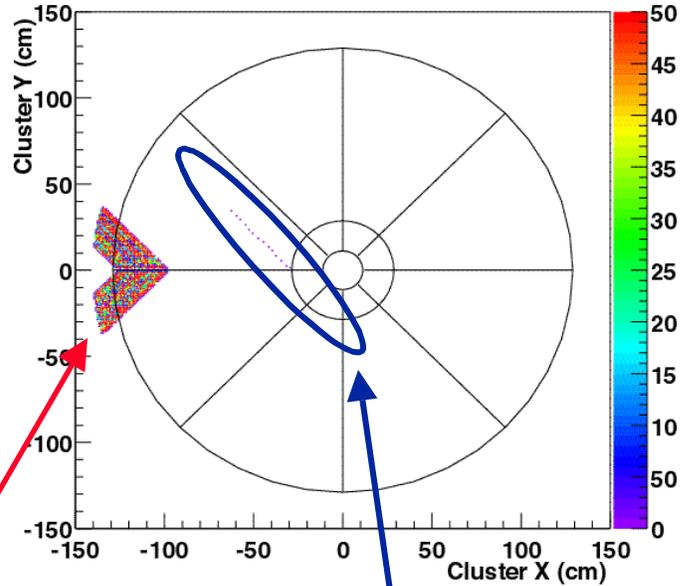
Cosmic Runs

Before

Cluster X versus Cluster Y East PES



Cluster X versus Cluster Y West PES

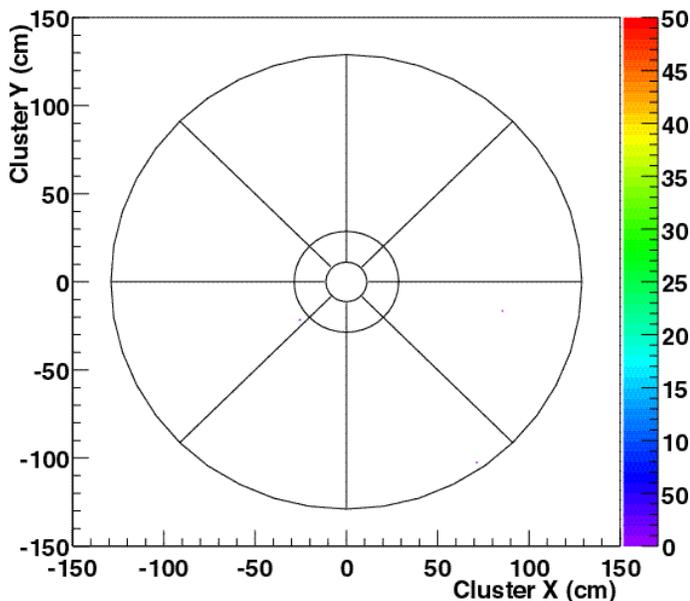


Hot spot

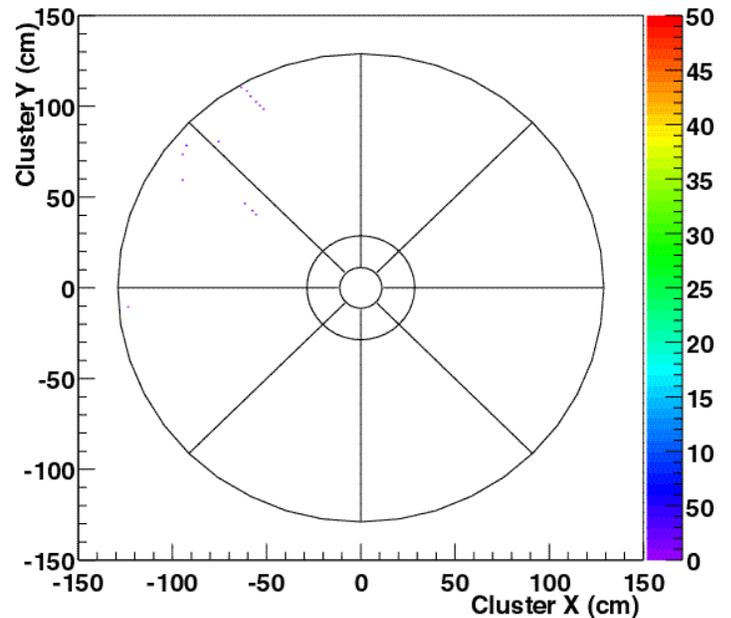
Cosmic ray?

After

Cluster X versus Cluster Y East PES



Cluster X versus Cluster Y West PES





What was fixed?

- **Heroic efforts of Karen Byrum & Mike Lindgren**
- **Installed last preamps to complete SMX installation**
- **Debugged System:**
 - **Replaced 1 +7.5 power supply (pcal05,s5)**
 - **Swapped/reseated 1 termination board (pcal11,s6)**
 - **Swapped 2 SMD boards to fix single channel problems**
 - **Swapped 2 MAPMTs**
 - **Fixed circuit breaker for fans;**
 - **Swapped a prom chip on all SMXRs to fix timing problem observed in Myron mode when performing timing scans.**
- **Screwed in all termination boards**
- **Found a mislabeled cable**



What is still broken?

- **Problems with monitoring output on termination boards**
 - **Should read ± 7.5 Volts**
 - **Instead read -10.0 and +5.0 Volts**
- **Fan speeds**
 - **Read 0% and 100% in same crate**
 - **If disconnect the termination board, the output switches!**
 - **Regardless, both fans are actually at 100%**
- **Need to swap a few more MAPMTS to fix single dead channels**
- **Also... for some MAPMTs a few channels cause problems with SMD calibrations**



Conclusions

- Made great progress in making this a fully functional sub-detector
- Reconstruction software looks good
 - Need to start worrying about things like
 - Eta resolution
 - Phi resolution
 - PEM-seeded clusters
 - Track-seeded clusters
- Only a few more electronics problems to solve
- Give us data!