A History Lesson on Pre-Production vs Production PR values

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Hcal Meeting → BHCal Meeting

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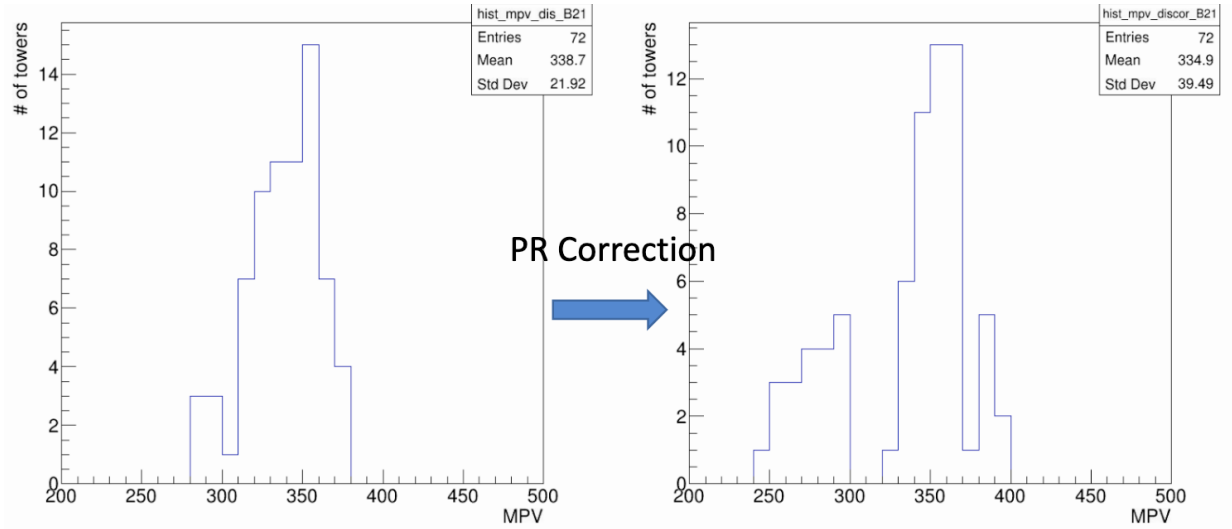
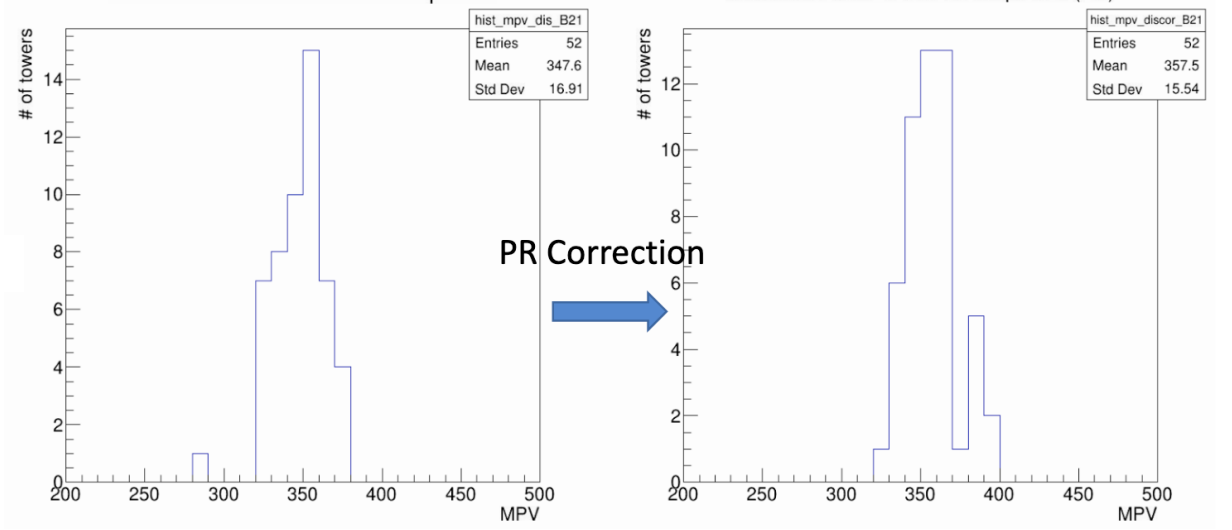
Using PR values for Calibrating the OHCal

- Hanpu Jiang's analysis demonstrates an difference between preproduction and production sectors
- Clear distinction noted when applying a correction for the PRs
- Correcting for the PR values produces a narrower distribution for the production sectors as expected
- So what's going on with the preproduction sectors?
  - Recall 3 important effects

All sectors:

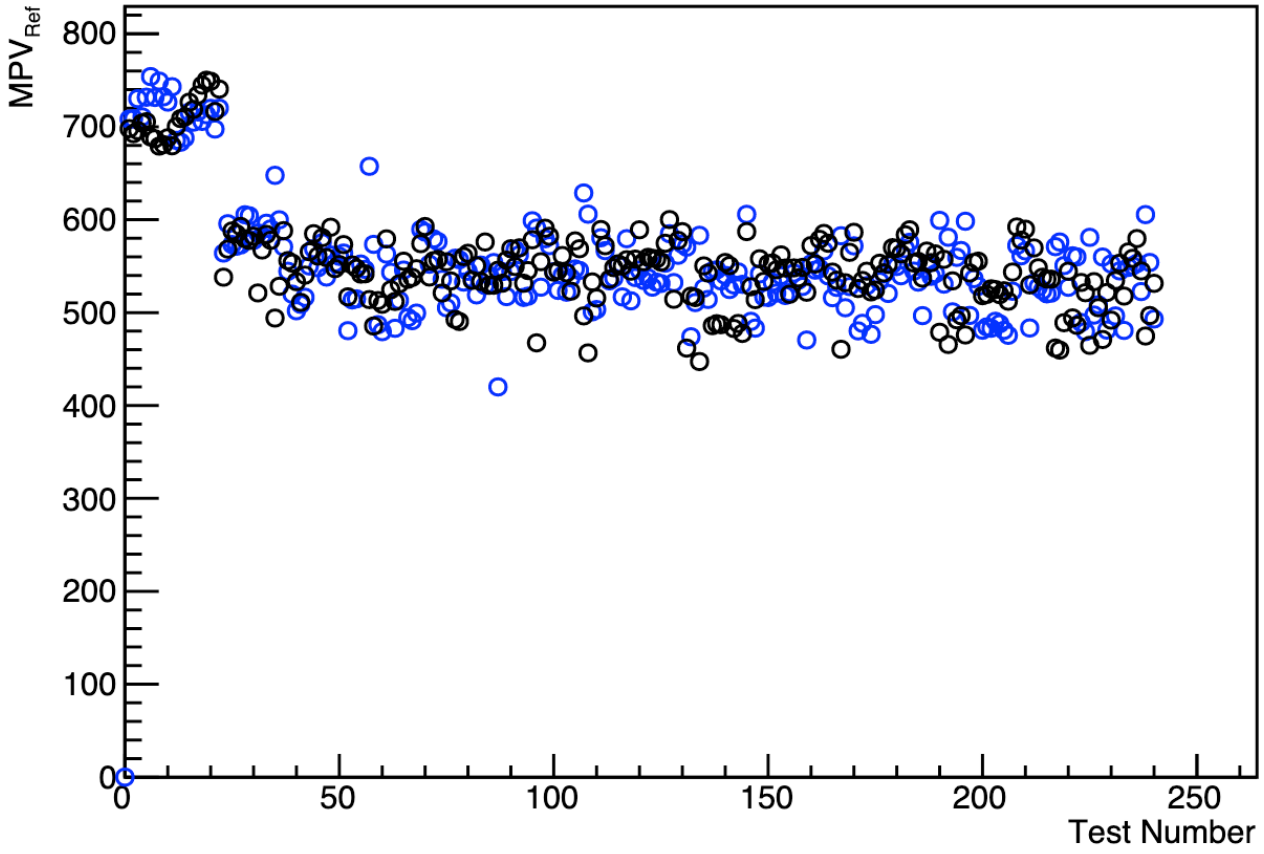


Production sectors:



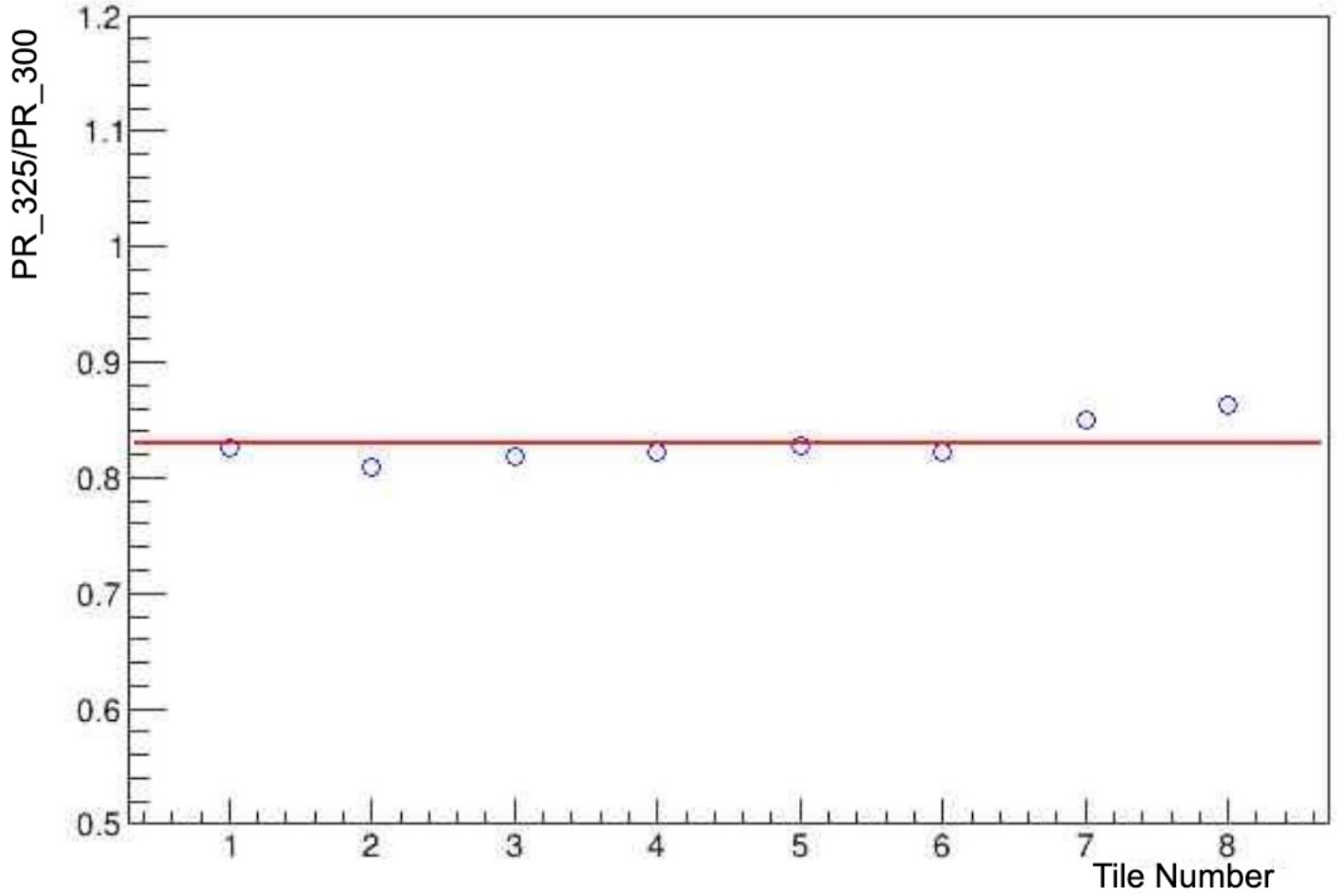
1. Threshold Issue

- Realized the threshold setting on the test stand changed for part of the testing period.
- Effects tile shapes B21-B24 only



Solution to the threshold issue

- Scaled PR to match PR at proper threshold based on tests comparing MPVs from different thresholds

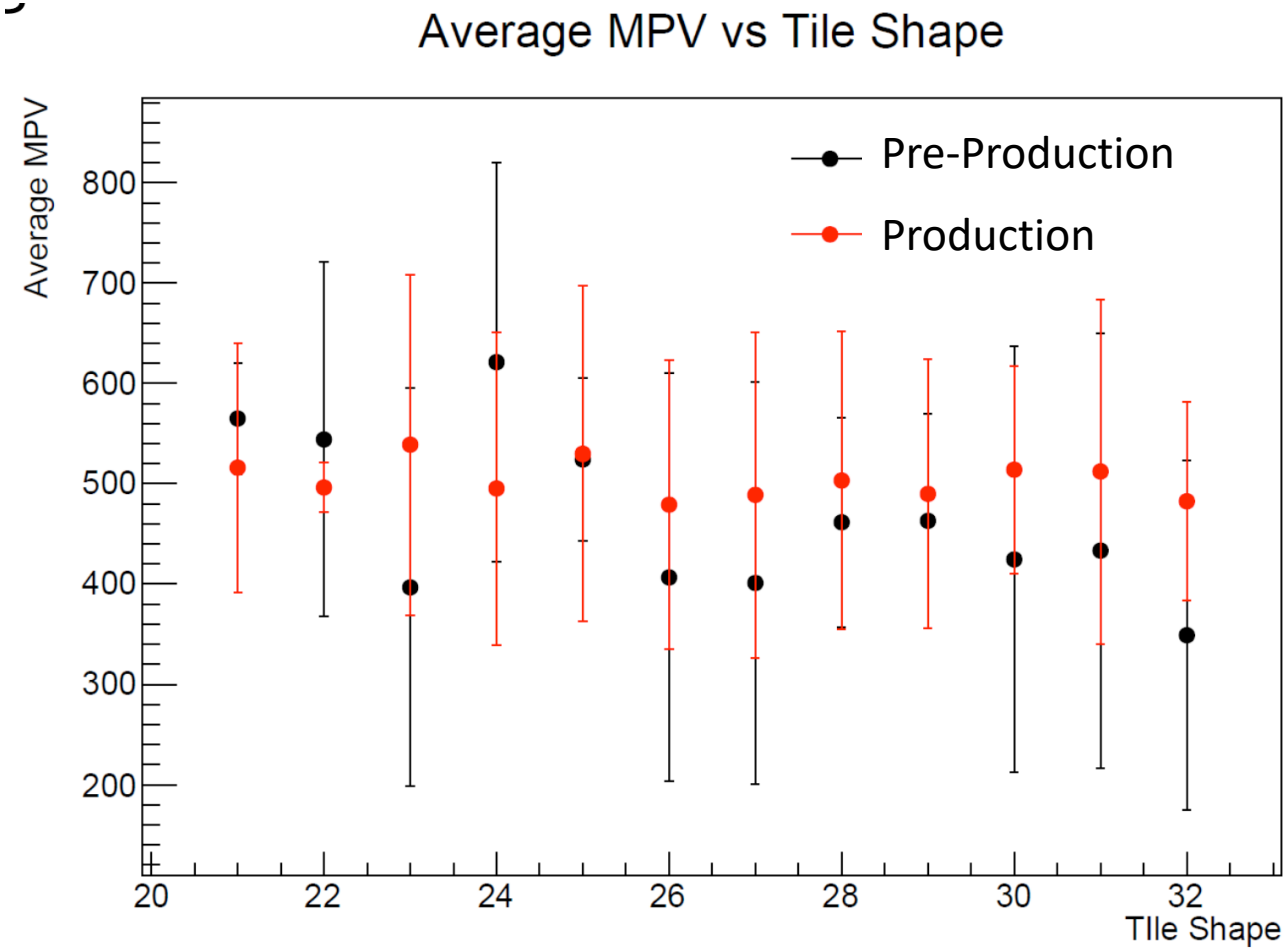


2. Test Stand Calibrations

- Current method:
  - “channel by channel calibration” calibrates the channels against each other
  - “meanshift correction” Shifts the mean of the distribution back to one
- Previous method:
  - Channel calibration and normalizing the distribution to one were done in one step
- Current method is preferred and yields a narrower PR distribution
- Current method was applied to production tiles but previous method was used in pre-production
- At the time comparing pre-production and production tiles to each other was not a concern

3. The tiles themselves

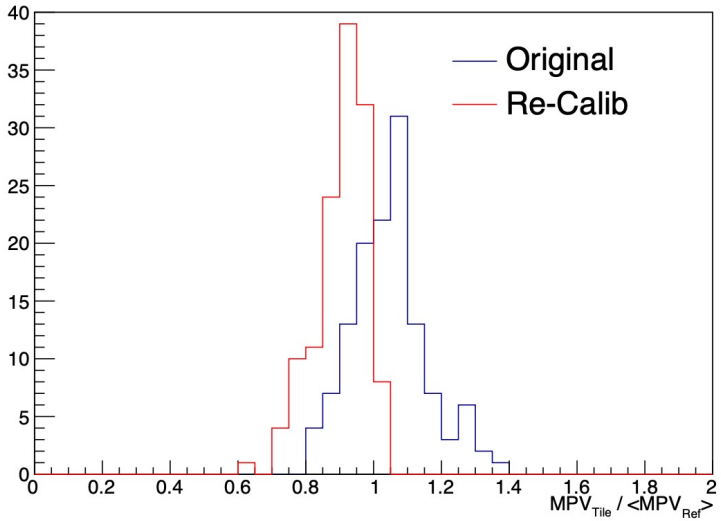
- Instead of looking at the PR values we checked the average MPV for each shape for the preproduction vs production tiles
- B21-B24: Threshold issue
- B25: Pre and Pro are the same
- B26-B32: Improved light yield seen in the production tiles which is not captured in the current PRs



Plot by Heleen Amedi

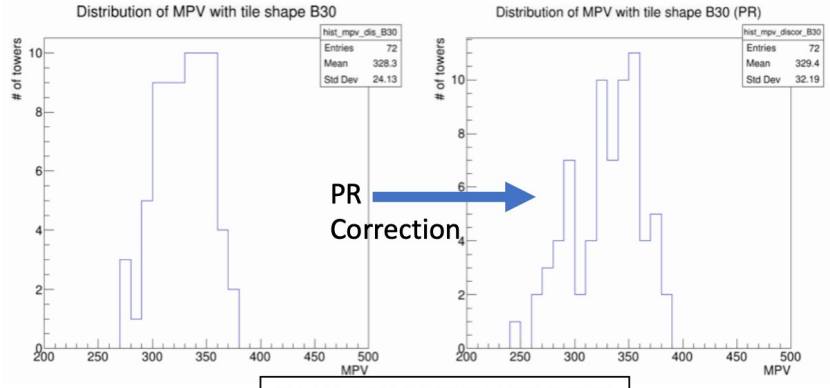
Confirmation of recalibration

B30 PR Comparison

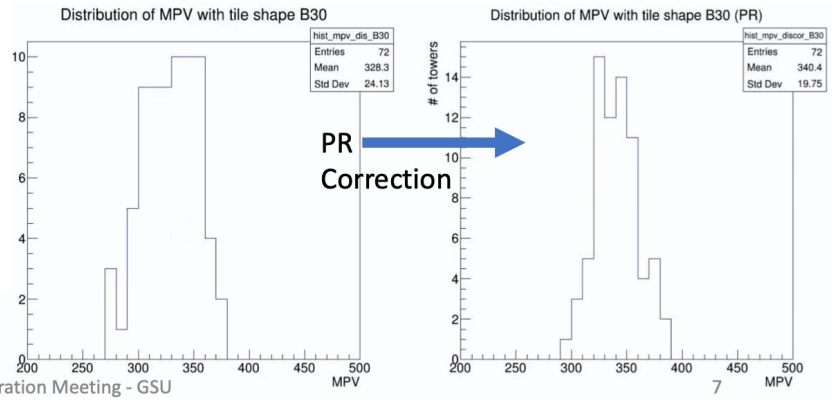


Results of re-calibrated GSU PRs for B30 pre-production

BEFORE GSU PR RECALIBRATION



AFTER GSU PR RECALIBRATION



Conclusion for BHCal

- We perfected the technique to extract the PRs and provide an initial calibration for the HCal during sPHENIX testing
- Trust that the new PR values are best.
- Good that we plan to retest all tiles with updated SiPMs using latest test stand calibration technique