

Test beam data analysis and plans for radiation hardness and magnetic field tests of photo sensors

DIRC meeting

February 2013

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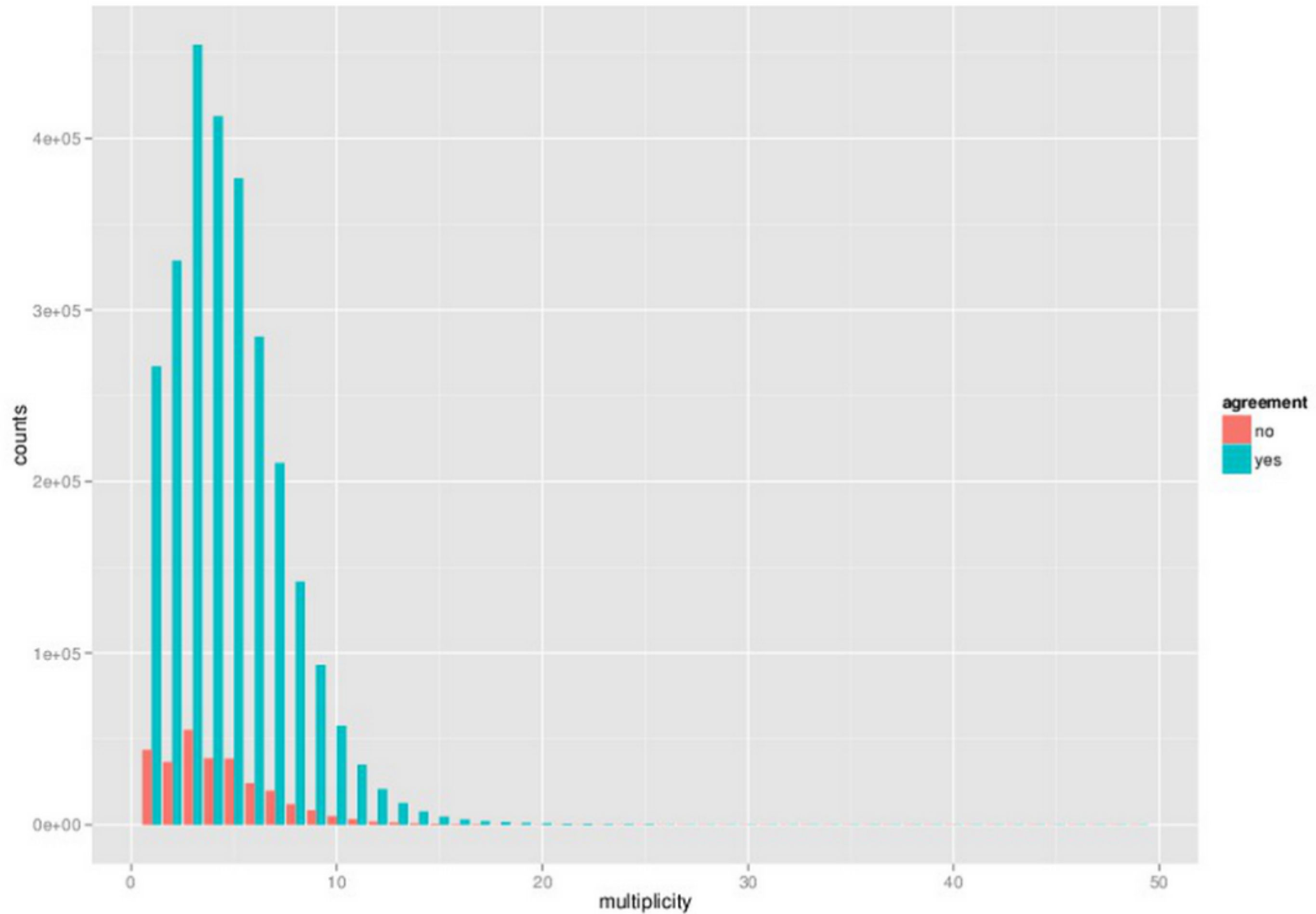
JLU Gießen



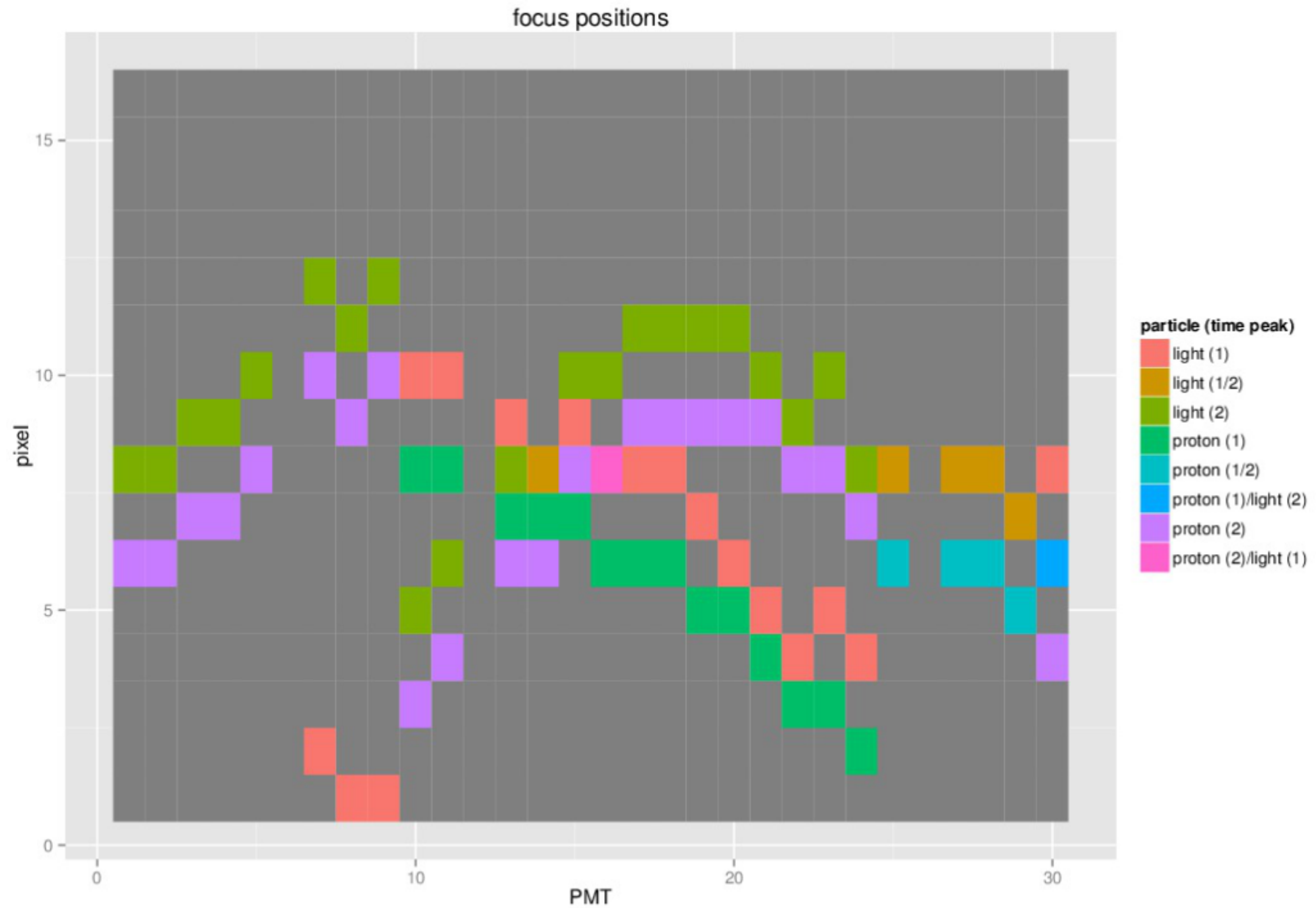
Outlook from December 2012

- ▷ Further investigations are needed to understand rates.
- ▷ Optimizations should improve PID quality.
- ▷ Monte Carlo and tracking information could improve PID.

December: Comparison of PID from DIRC with TOF and gas Cherenkov



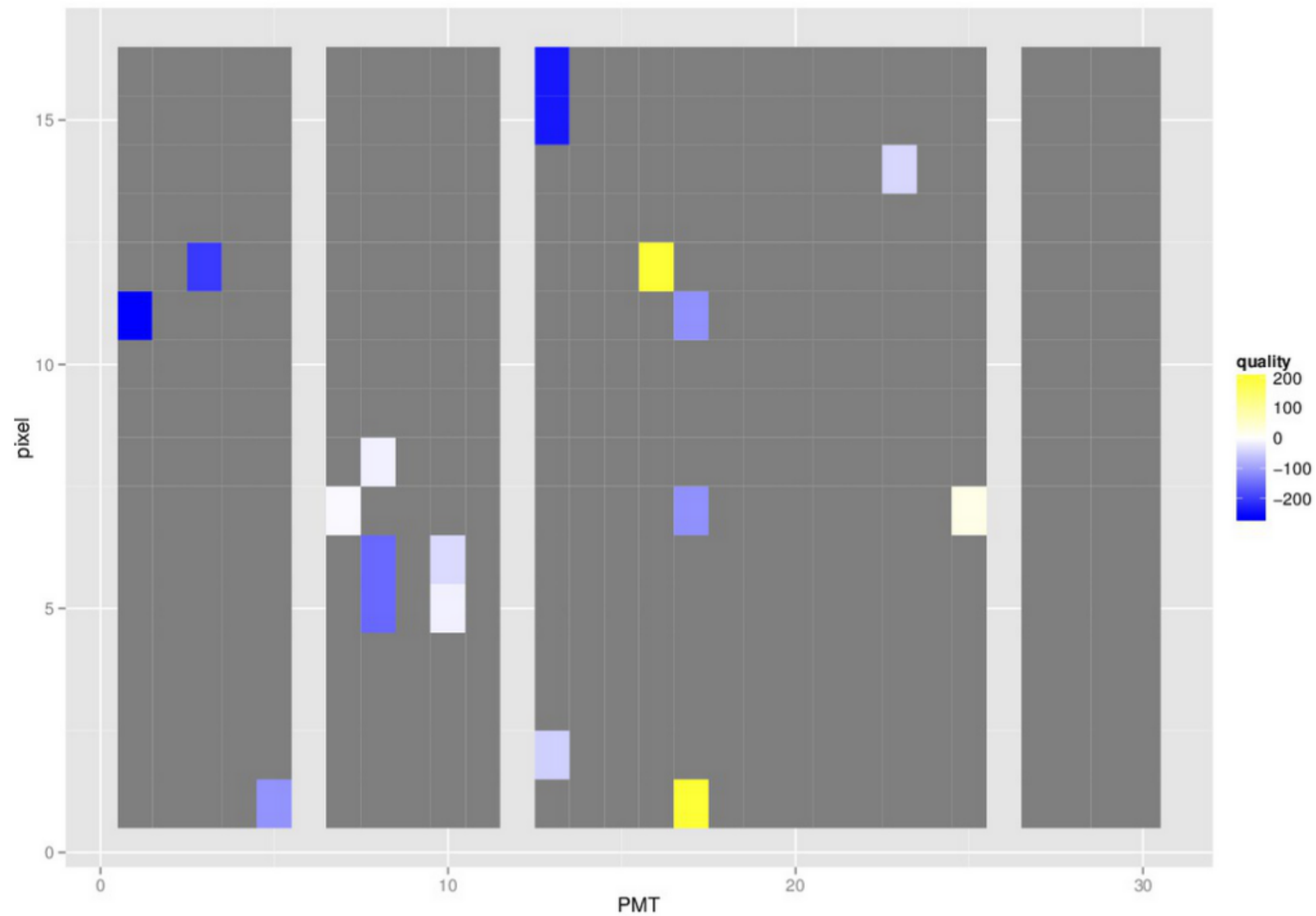
December: focal positions map



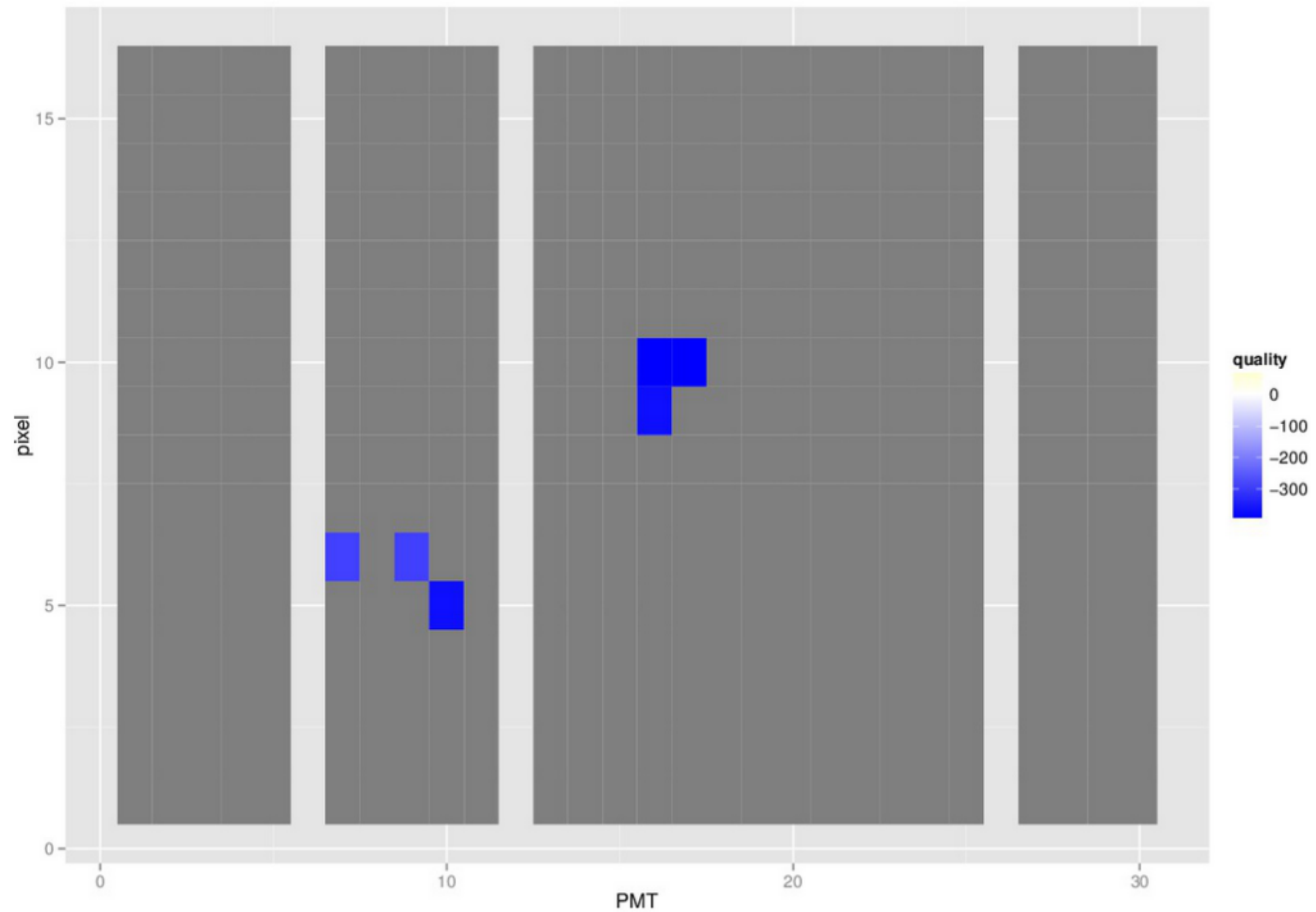
Improved data analysis

- ▷ Determine number of detected photons for each particle and each pixel in correct time window from data set.
- ▷ Calculate photon detection probability for each pixel.
- ▷ Use these numbers to calibrate the detector.
- ▷ Use calibration results to analyze single events.

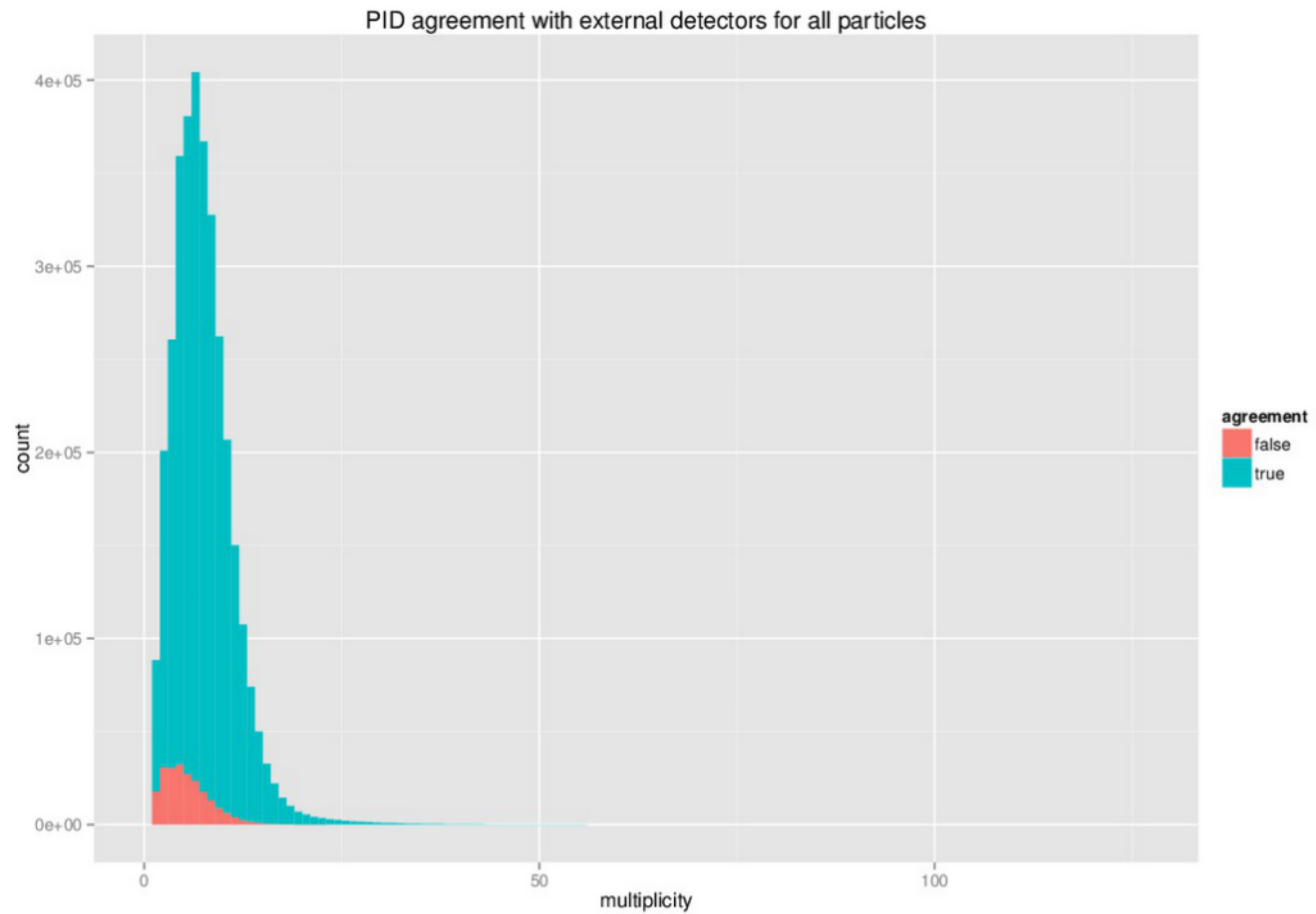
Single event example



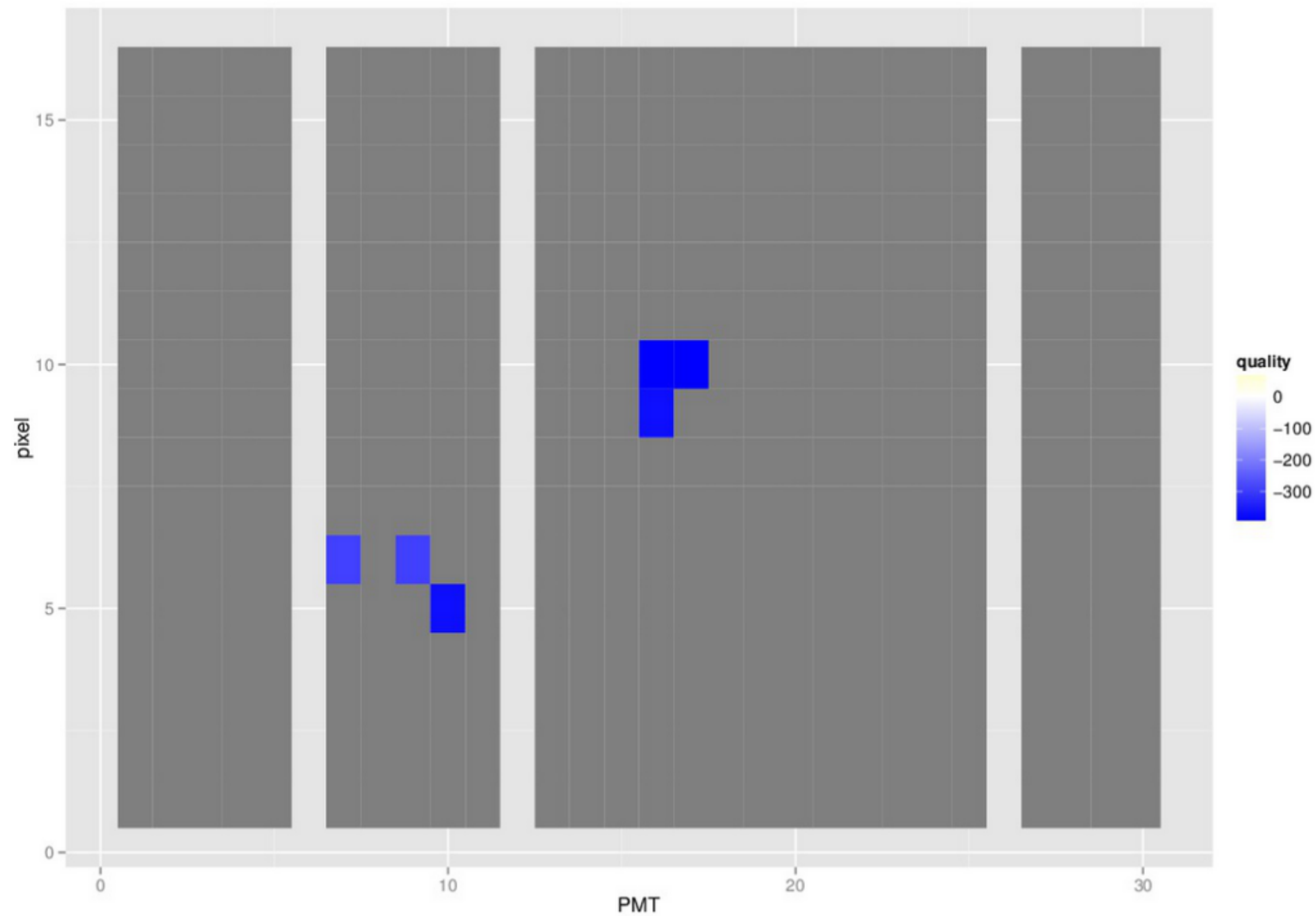
Single event identified as light particle



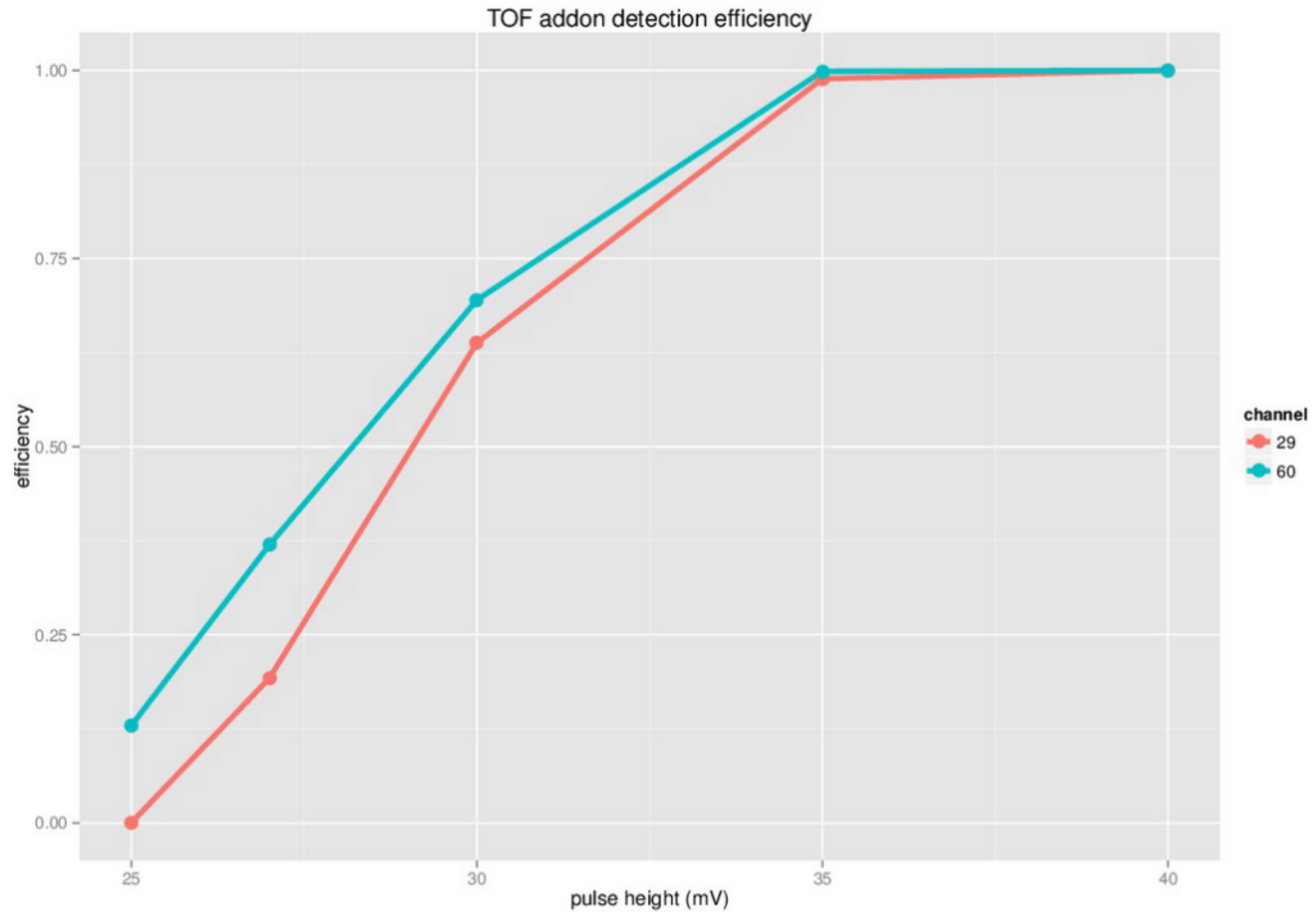
New PID results



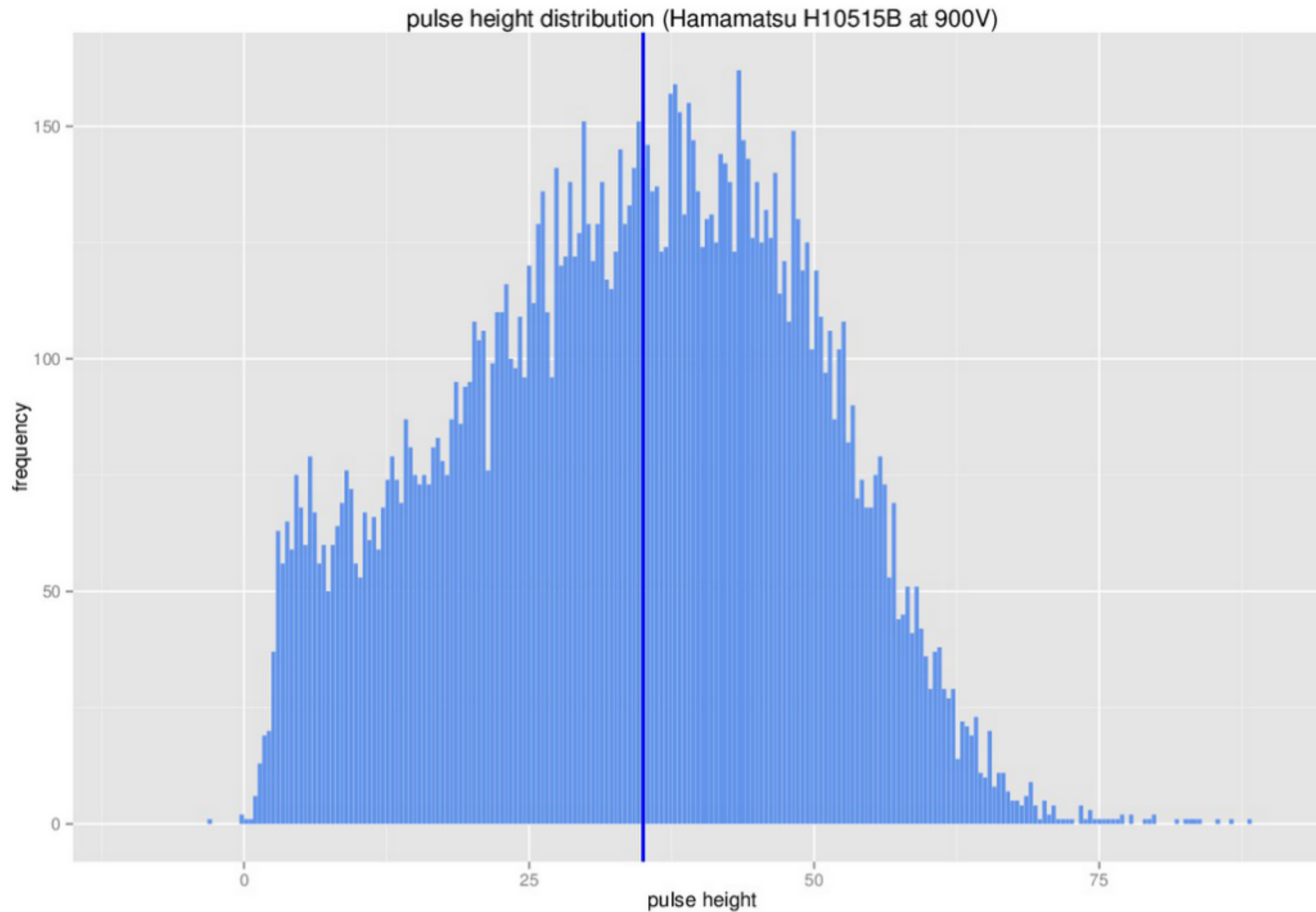
Where are the photons?



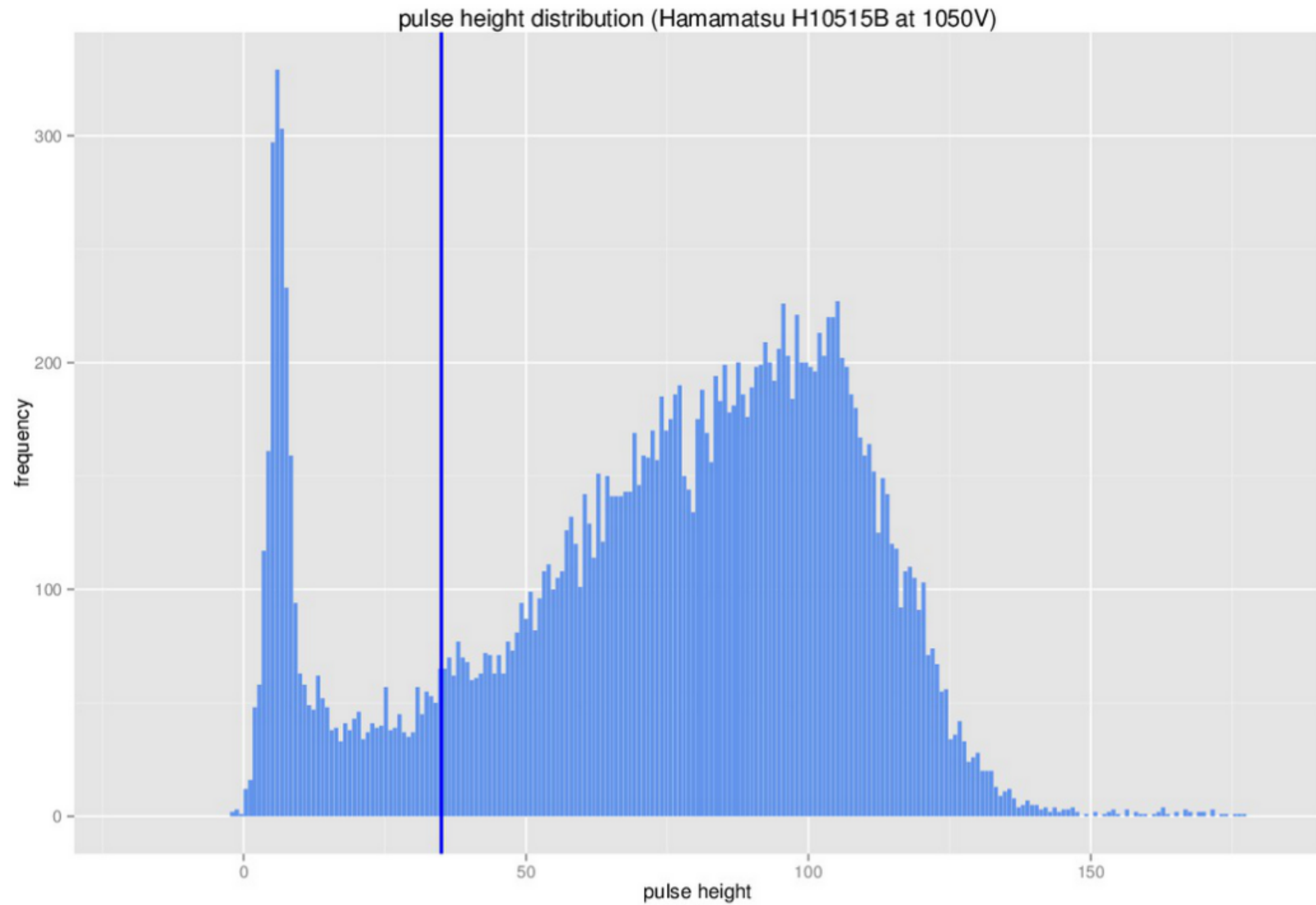
Detection efficiency of frontend electronics



✘ Pulse height distribution at 900V (maximum supply voltage)



✓ Pulse height distribution at 1050V



Summary

- ▷ Particle identification method has been improved.
- ▷ Frontend electronics performs well with PMTs' supply voltage above limit.

Outlook

- ▷ Amount of detected photons is still not fully understood. More investigations are necessary.
- ▷ Radiation hardness test with Philips dSiPMs is scheduled for April.
- ▷ Tests with resistive sea tubes from Photek are planned.