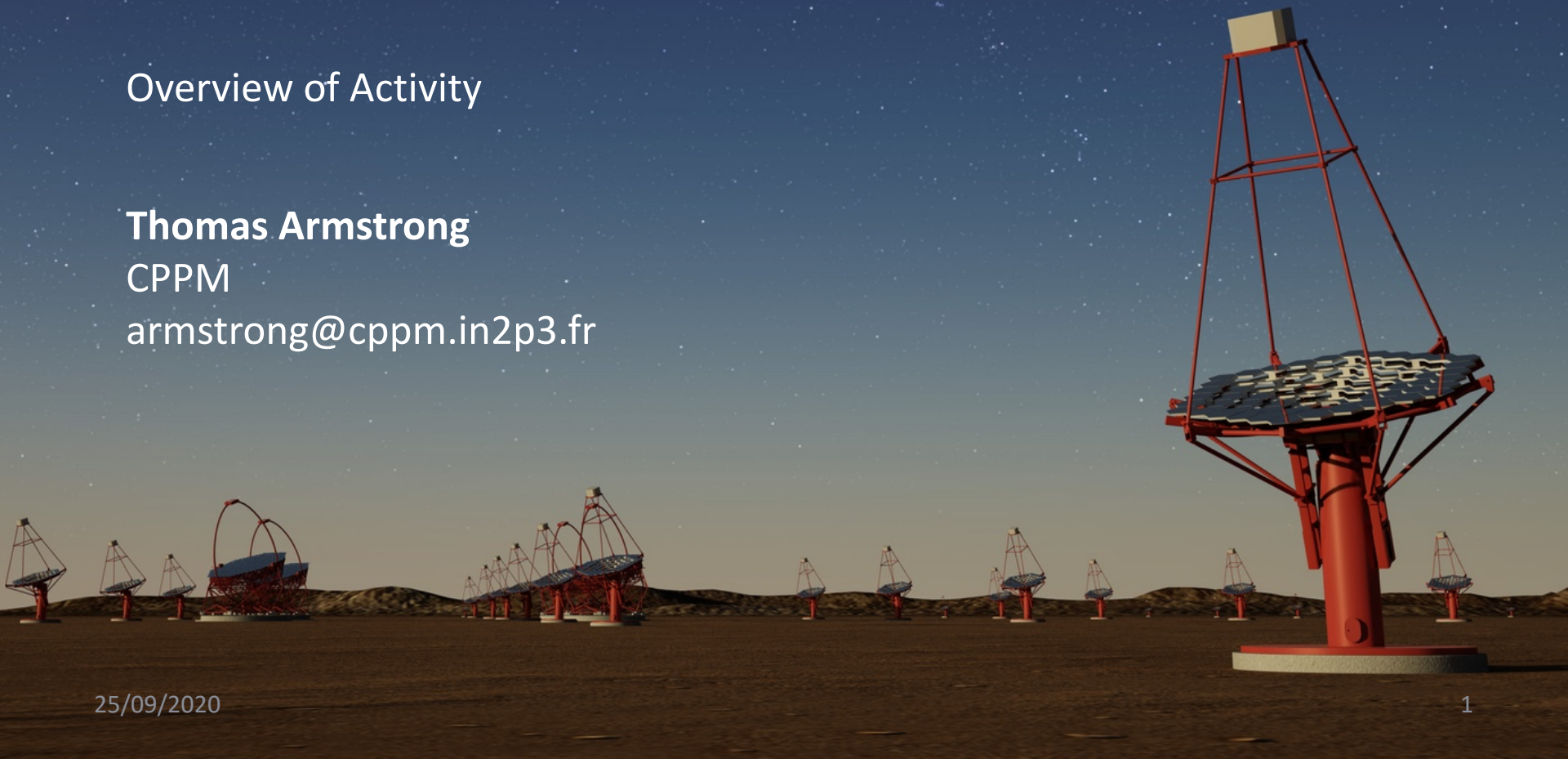
MC Validation of NectarCAM

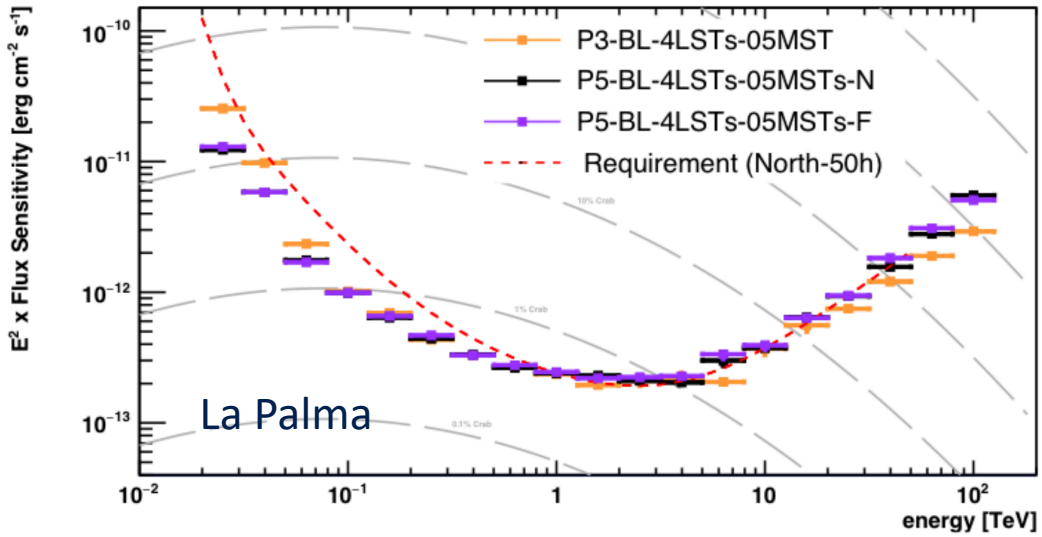
Overview of Activity

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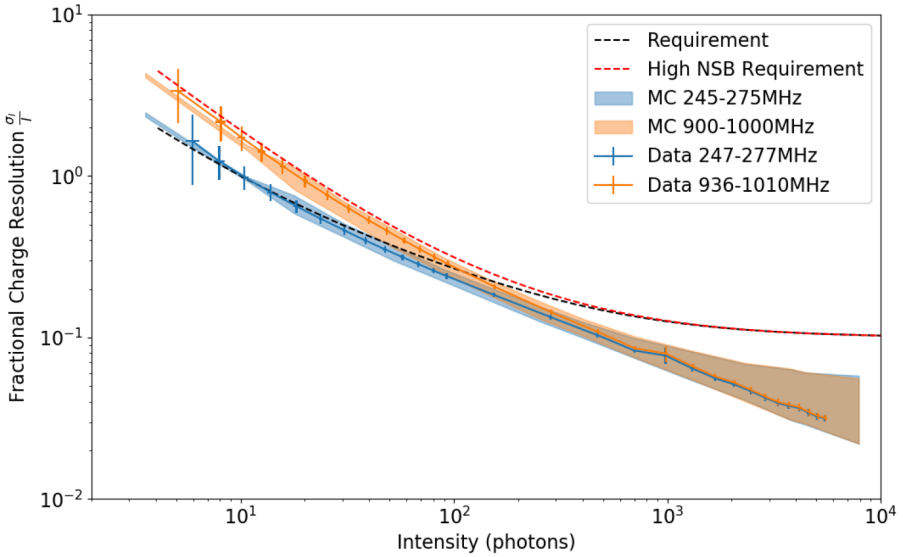
NectarCAM Overview

- MC model validation in preperation for prod5 and evaluation of requirements.
  - Document with model parameters found on GitLab, meeting minutes on redmine
  - Prod5 Completed and undergoing analysis: For La Palma (below) and Paranal, NectarCam and FlashCam performance are the same (See talk by Gernot)



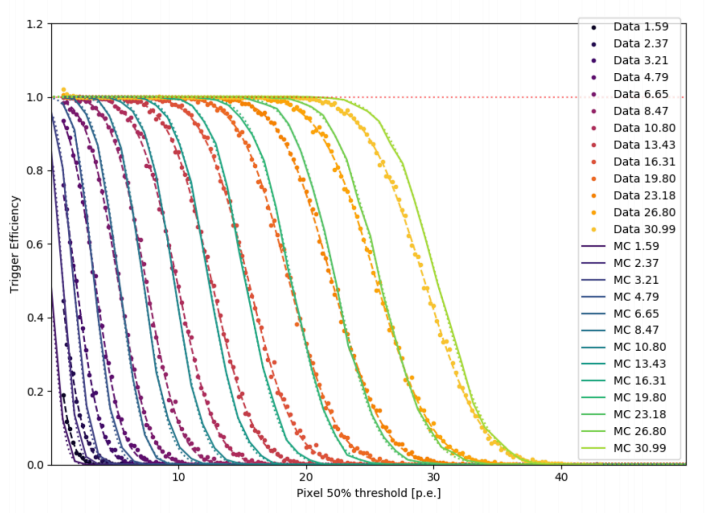
Intensity Resolution

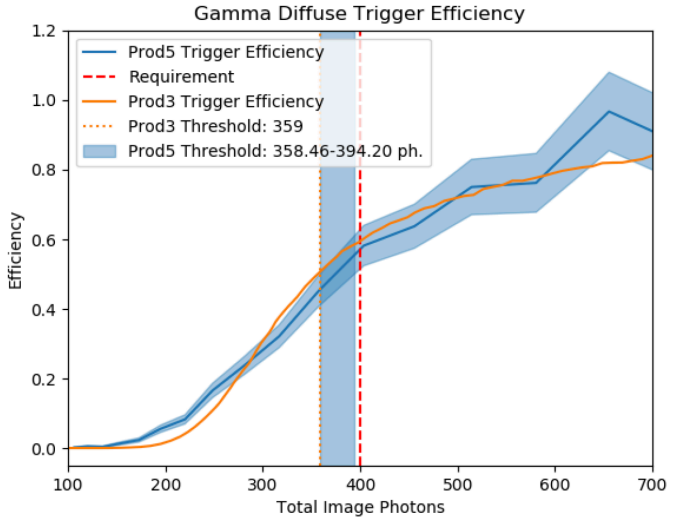
- Indicator of matched performance on the readout.
  - IRFU lab set-up simulated, range of NSB investigated.
  - Compared to requirement **B-TEL-1010**
- Report [NectarCAM-B-TEL-1010.pdf]



Trigger Performance

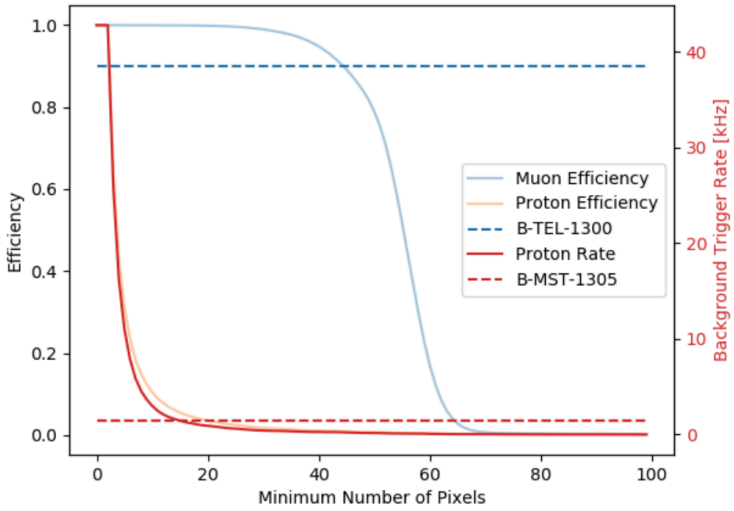
- Indicator of matched performance on the trigger.
  - Same set-up, matcher performance of both L0 and L1 trigger performance.
  - Performed on-sky single telescope simulaitons to evaluate **B-MST-1230/1235.**
- Report [MST-CAM-AN-356-CPPM-v0.2.pdf]





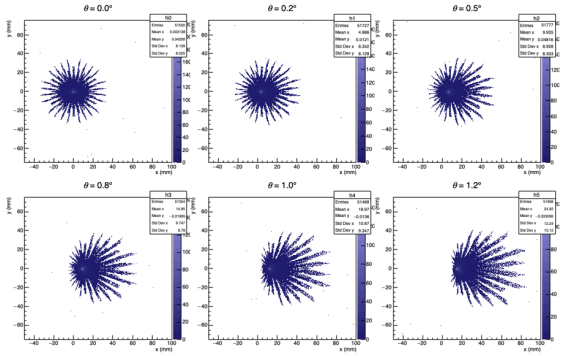
Muon Flag

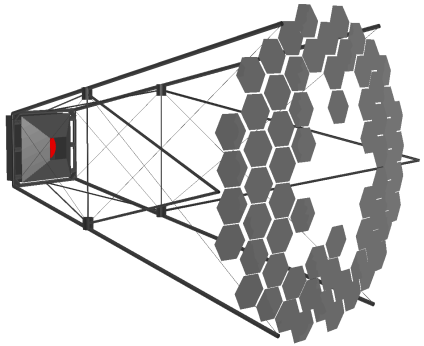
- Study to evaluate requirement **B-TEL-1300** (and **B-MST-1305**)
  - Required 90% muon selection with local trigger rate < 1400 Hz
  - Can be met with simple pixel multiplicity flag. Simulations show 99% efficiency and local trigger rate of 451 Hz for 29 pixel multiplicity
- Report [NectarCAM_B-TEL-1300_Muon-Flag.pdf]

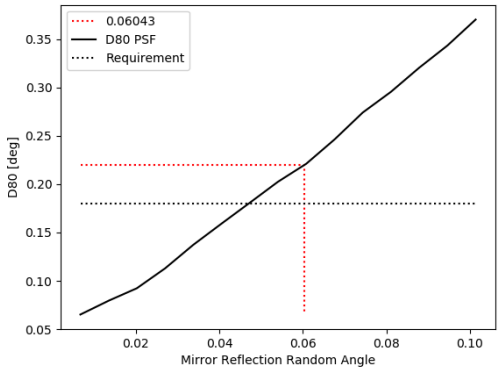


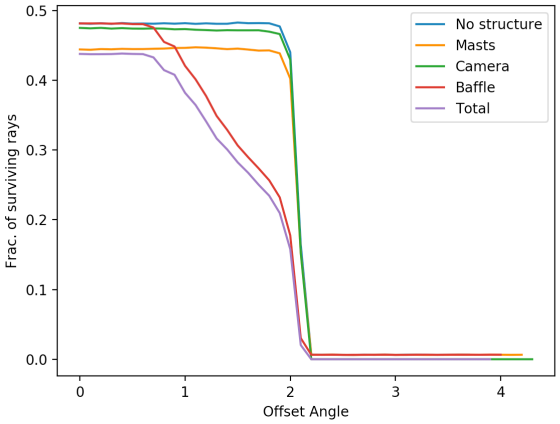
Adlershof

- Currently working on Simulations for the Adlershof campaign.
  - Configuration is complete now with inclusion of PSF (matched to observed 0.22 deg) and shadowing from baffle.



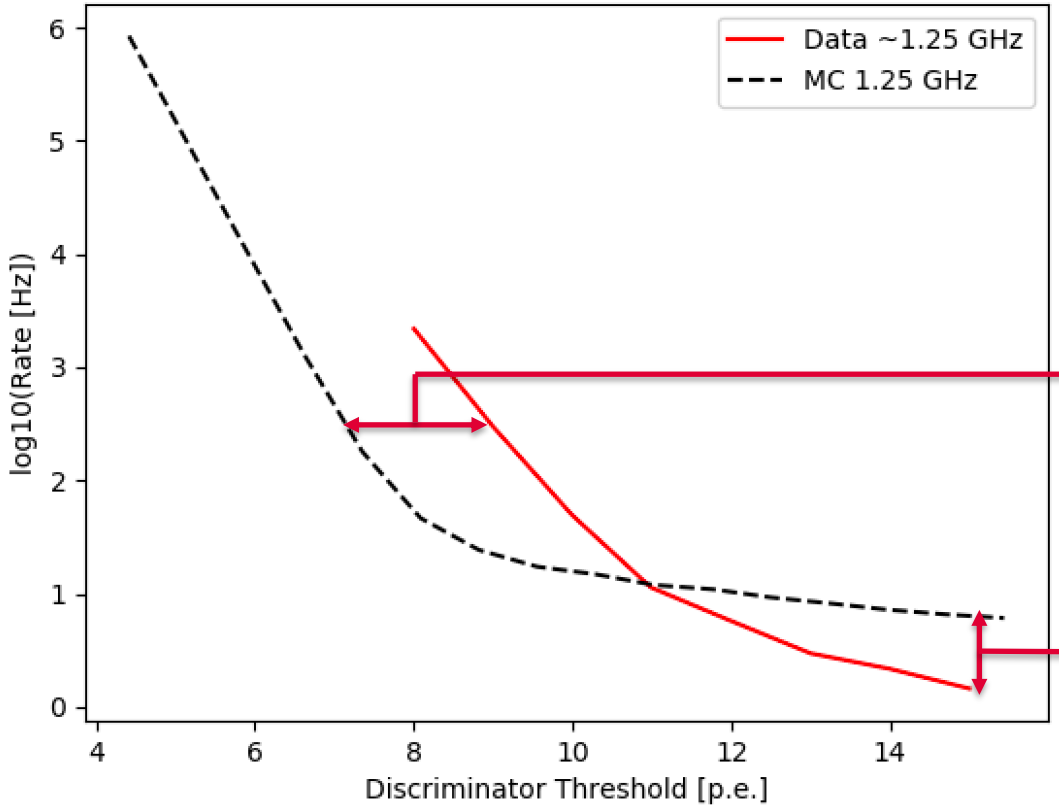






Preliminary Rate Scan

- Early Adlershof Results



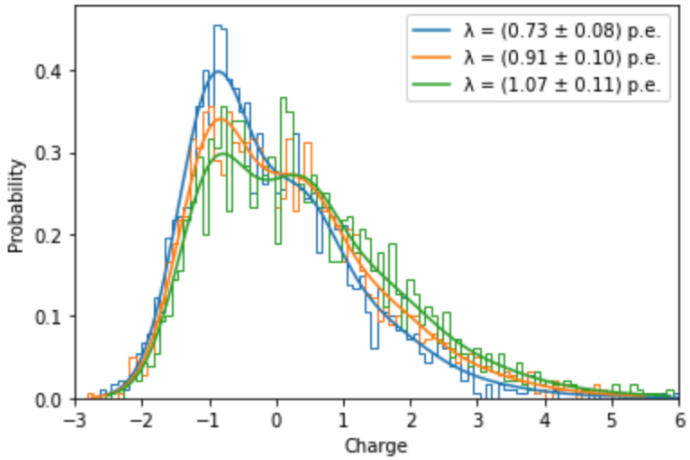
Data: [Run 1249 - 1259]

Not sure, could either be incorect calibration of x-axis or incorect evaluation of NSB

Mostly understood, haven't yet included mirror degredation

Quick aside/advertisement

- spefit – “Optimised framework for the fitting of single photoelectron spectra in order to characterize the properties of photomultipliers which influence the measured illumination response.”
  - https://gitlab.cta-observatory.org/cta-consortium/aswg/tools/spefit
  - J Watson looking for input for different models that could be included
    - Contact: jason.watson@desy.de

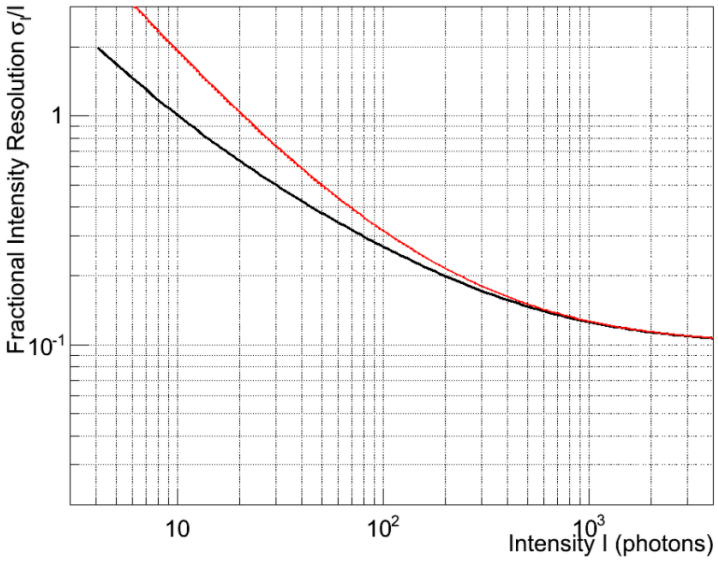


Backup



B-TEL-1010

- The required fractional Intensity Resolution for Cherenkov signals in each Camera pixel for a specified background level of 0.24 photons $ns^{-1}sr^{-1}cm^{-2}$ (black curve) and for the highest NSB levels required for a given telescope type (red curve) is given in the Figure below and Table attached. Intensity measurements must be possible for 0-4000 photon signals. The average intensity resolution should be calculated for the Reference Gamma-Ray Flux.



B-MST-1230/1235

- For gamma-ray initiated showers with the Reference Gamma Spectrum, the Cherenkov light intensity that is needed to generate a Camera trigger with a probability of at least 50 % over 90 % of the solid angle within the required camera field of view and with any image orientation, must be smaller than: $I_{thresh} \times (F_{NSB} / 0.24\ ns^{-1}sr^{-2}\ cm^{-2})^{1/2}$ photons over the full required NSB range or I_{thresh} if $F_{NSB} < 0.24\ ns^{-1}sr^{-2}\ cm^{-2}$. The value of the threshold image amplitude I_{thresh} must be < 400 photons in the wavelength range 300-550 nm. F_{NSB} is given as the light flux at ground level in the wavelength range from 300-650 nm and can be assumed to follow the Background Light Spectrum.
- For proton initiated showers following the Reference Proton Spectrum, the Cherenkov light intensity that is needed to generate a local camera trigger with a probability of at least 50% over 90% of solid angle of the required camera field of view and with any image orientation, must be < 600 photons.

B-TEL-1300/B-MST-1305

- The Camera must be able to trigger on, and flag prior to transmission of R1 data to the OES, fully contained (within the sensitive area of the camera) muon rings, from muons impacting the mirror with an energy > 20 GeV with an overall efficiency greater than 90% (excluding dead-time). The fraction of falsely flagged muons in the data stream to OES may be high as long as this efficiency requirement is met and the overall Local Event limit (B-*ST-1305) is not exceeded.
- The Camera must deliver events without associated array level coincidences (Local Events) to the OES at a rate of less than 1400 Hz. Such events must be flagged as Local Events.