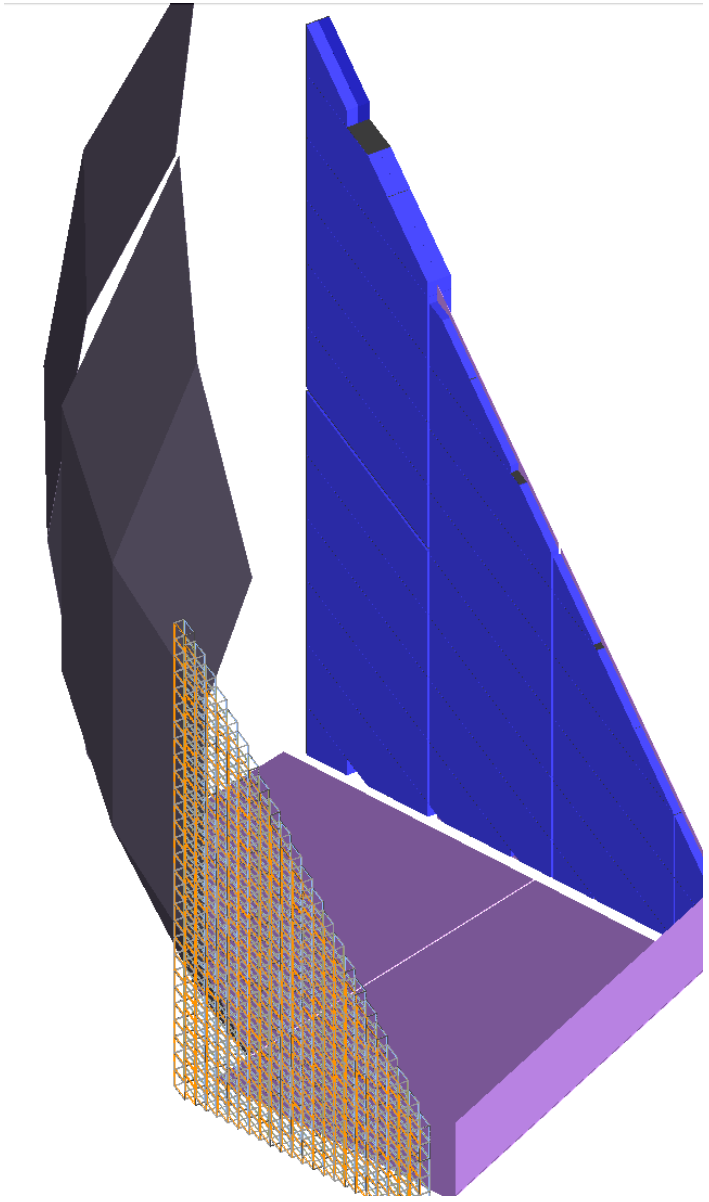
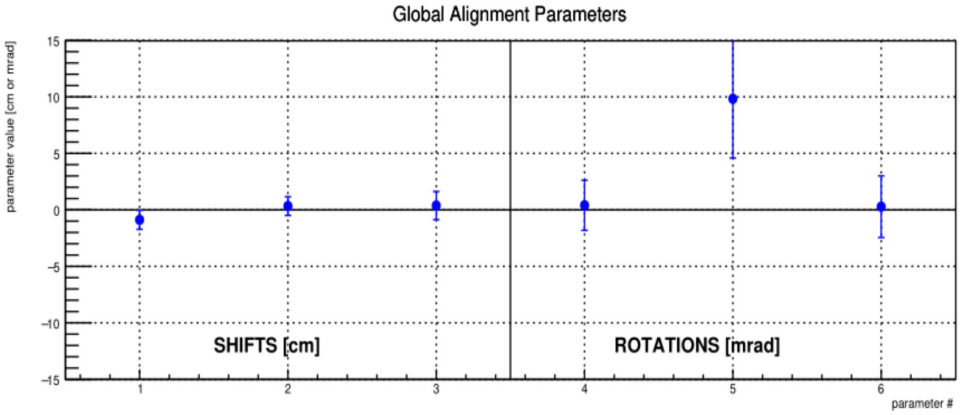
The CLAS12 RICH detector

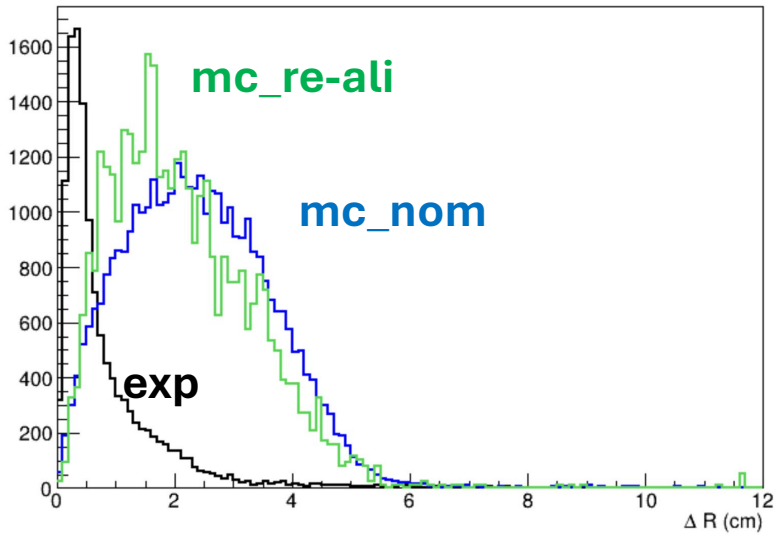
1. **geometry and alignment**
2. **digitization**
3. **optical effects**
4. particle identification

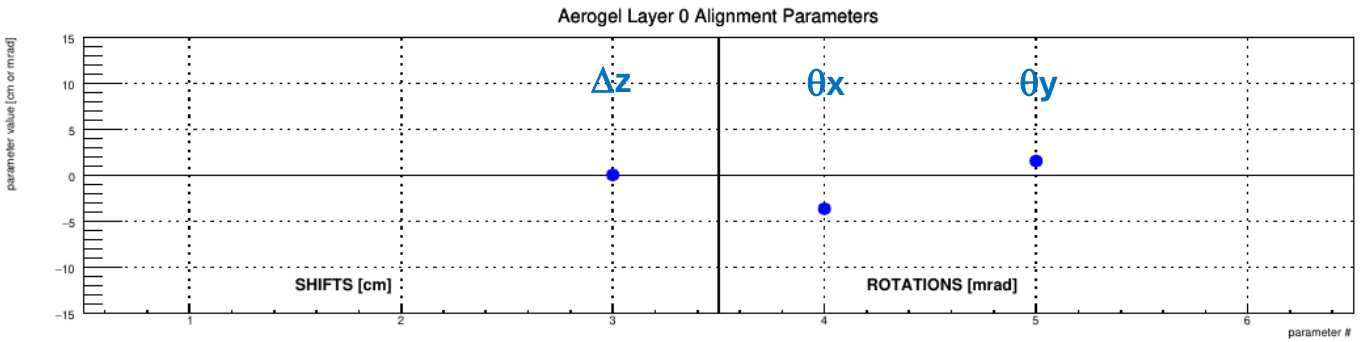


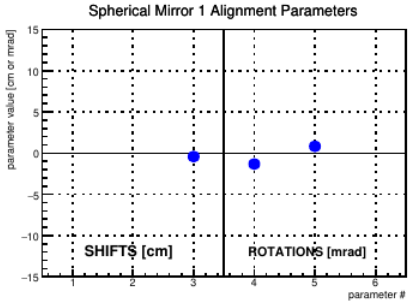
Geometry and alignment

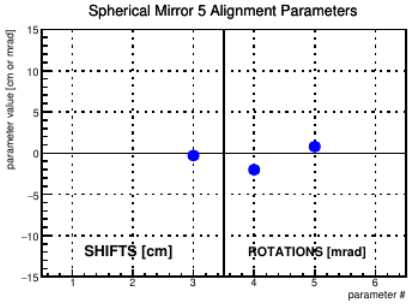
1. **Global alignment: Matching between track trajectories and clusters**
2. **Mirrors+aerogel alignment:Reconstructed Cherenkov angles**

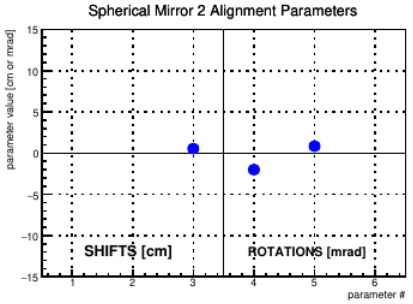




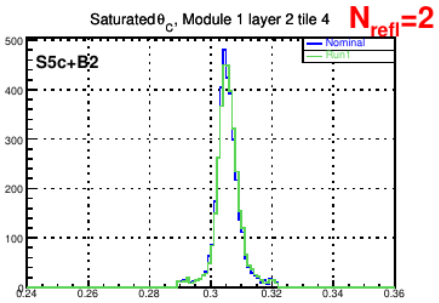


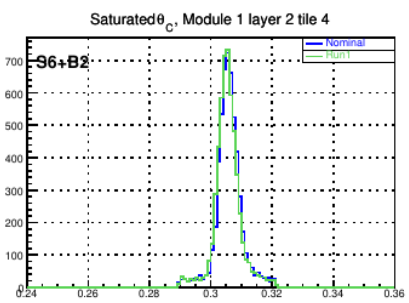


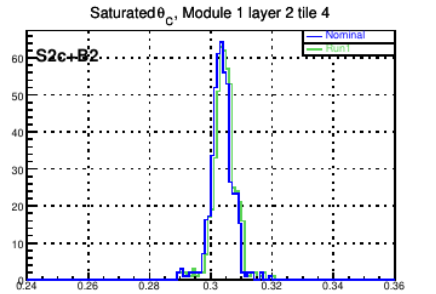


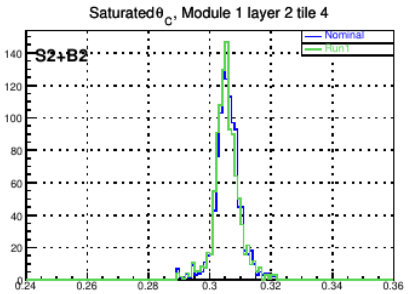


2 reflections
blue: nominal
green: re-aligned









Digitization

1. **MAPMT response to single p.e.: quantum efficiency, number of amplification stages, gain, H8500 vs H12700**
2. **ADC: conversion to collected charge, pedestal**
3. **TDC: MAPMT time response, MAROC preamp, time walk, conversion to time (1 ns time stamp)**

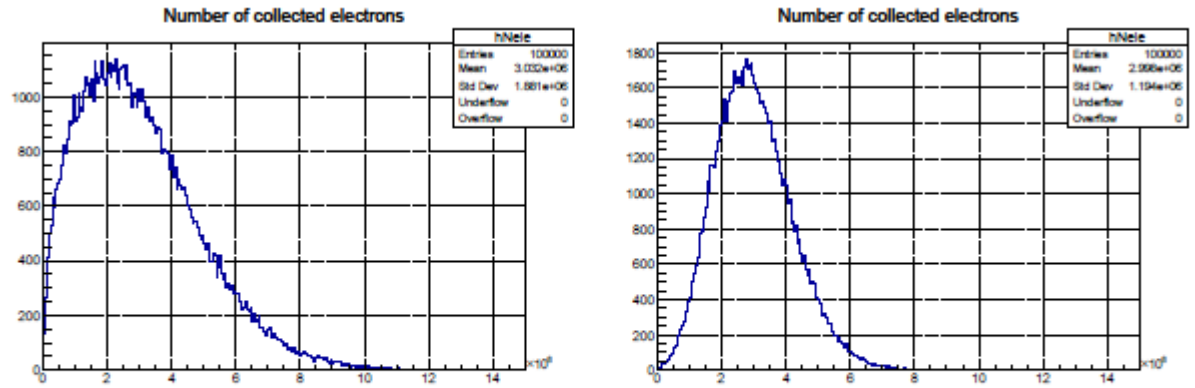
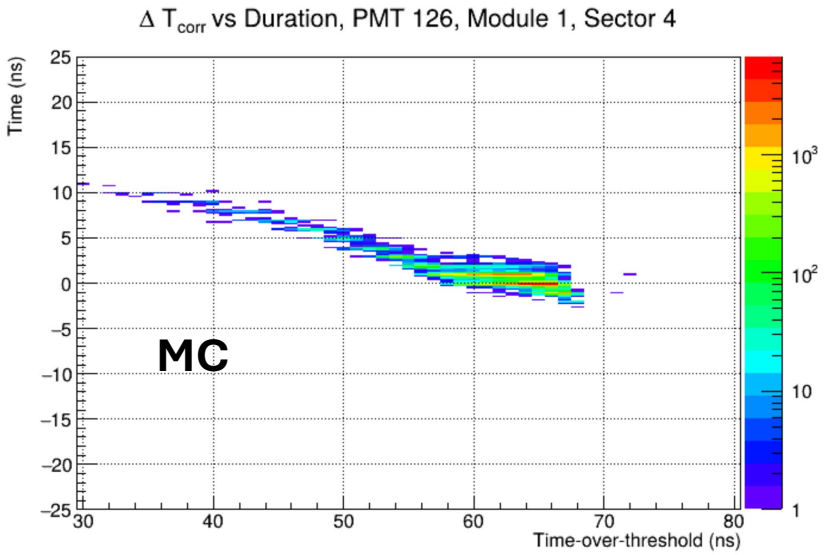


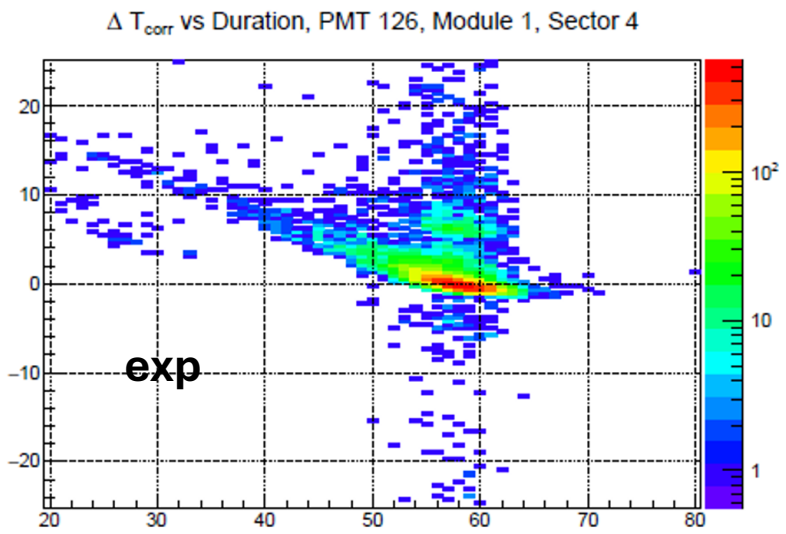
Figure 1: Number of electrons produced by a single photon hit on a H8500 (left) and on a H12700 (right) for typical gain values in Tab. 1.

Parameters tuned to characterization measurement results

- **average values**

Similarly to the real data, the simulations have to be calibrated





Optical effects

Data from RGA simulations on OSG

/volatile/clas12/richcap/New_MC_SIDIS_Files_Volatile/clasdis_1.5_Cut_Files_Not_Added_To_cache_yet/55nA_Backgrounds

Aerogel

1. Cherenkov spectrum: refractive index, dispersion
2. Volume effects: Absorption, Rayleigh scattering, forward scattering
3. Surface effects: planarity

Mirrors

1. Surface accuracy
2. Reflectivity

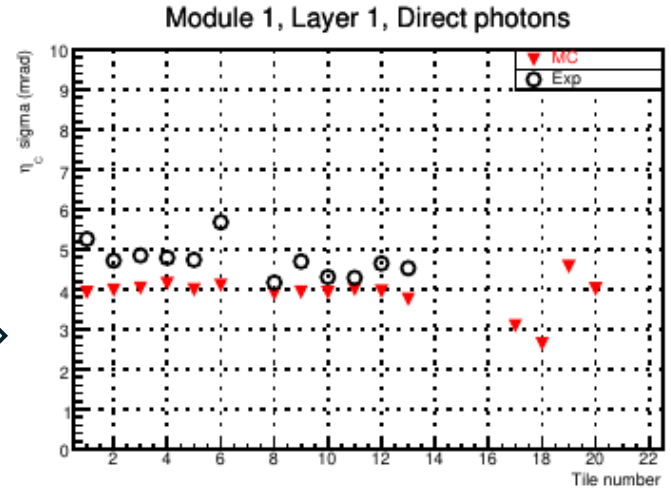
DC Tracking

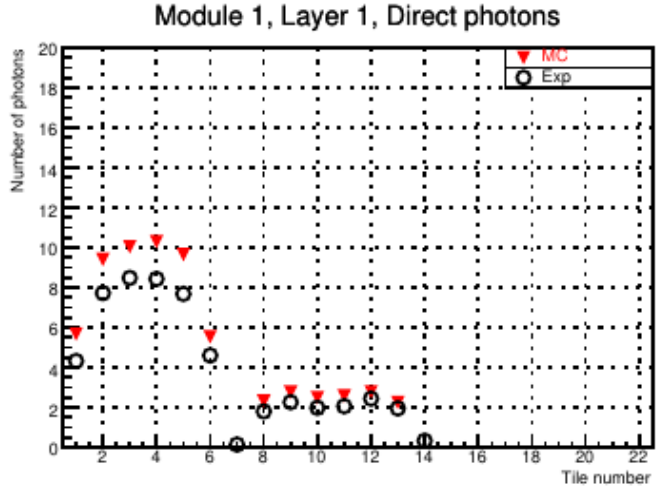
1. Emission point
2. track direction

Optical parameters in GEMC tuned to characterization measurement results

- individual element
- average

0 reflections

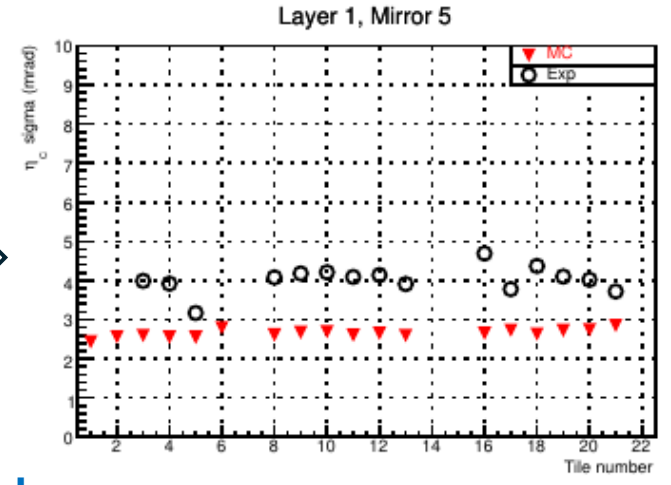


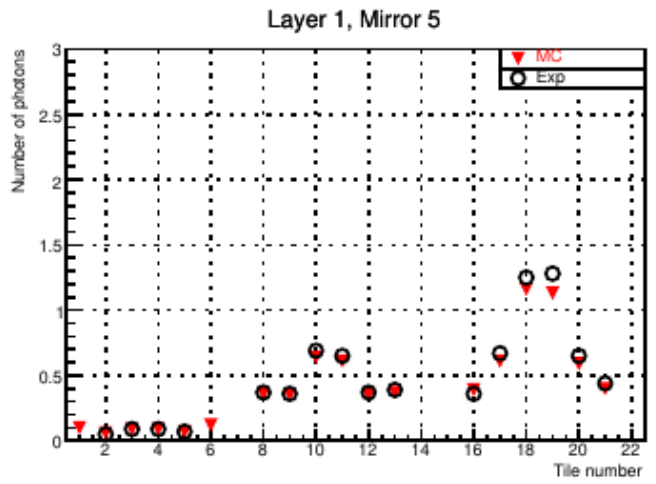


Cherenkov angle resolution

Number of photons per track

2 reflections





Similarly to the real data, the simulations have to be calibrated