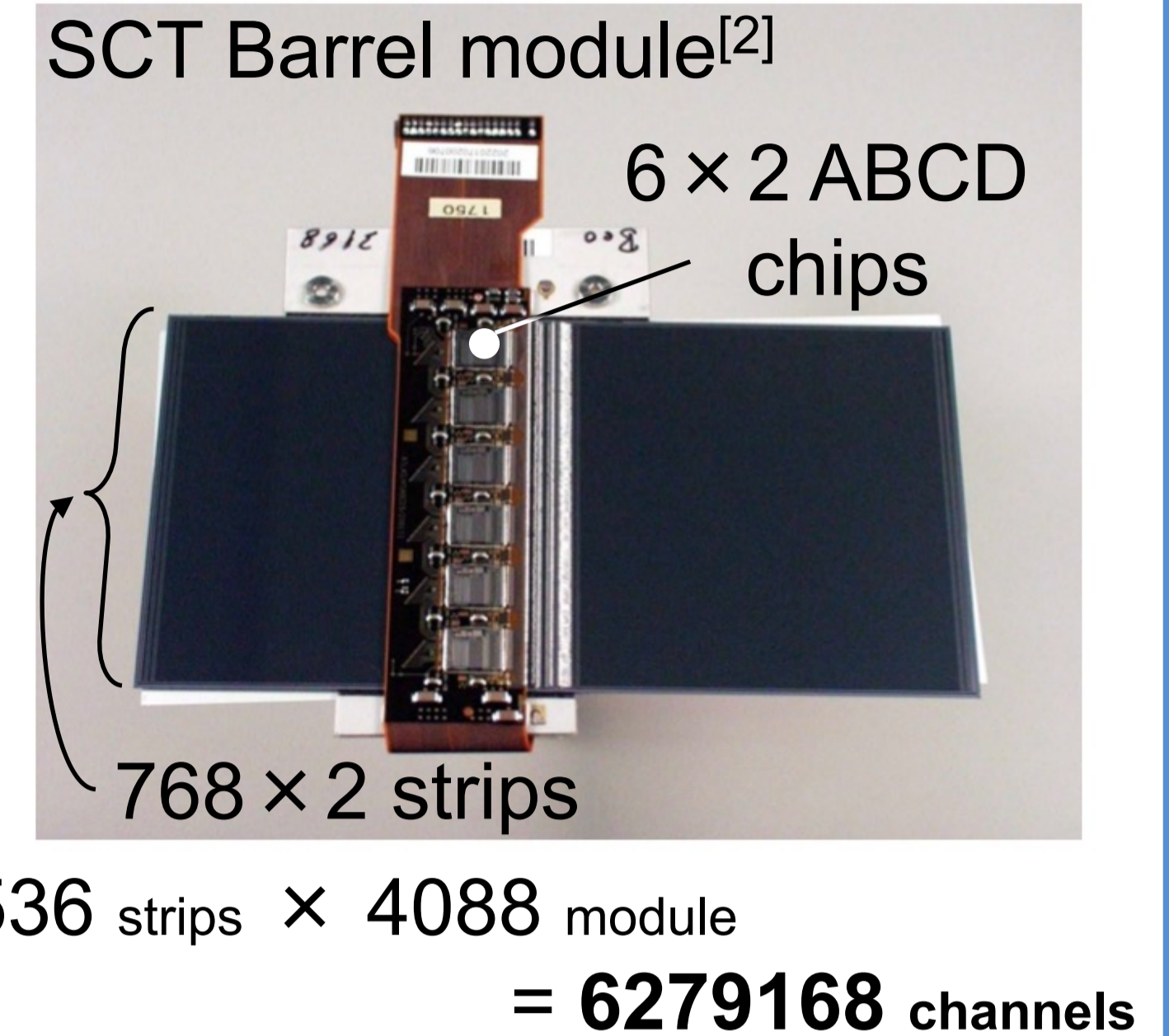
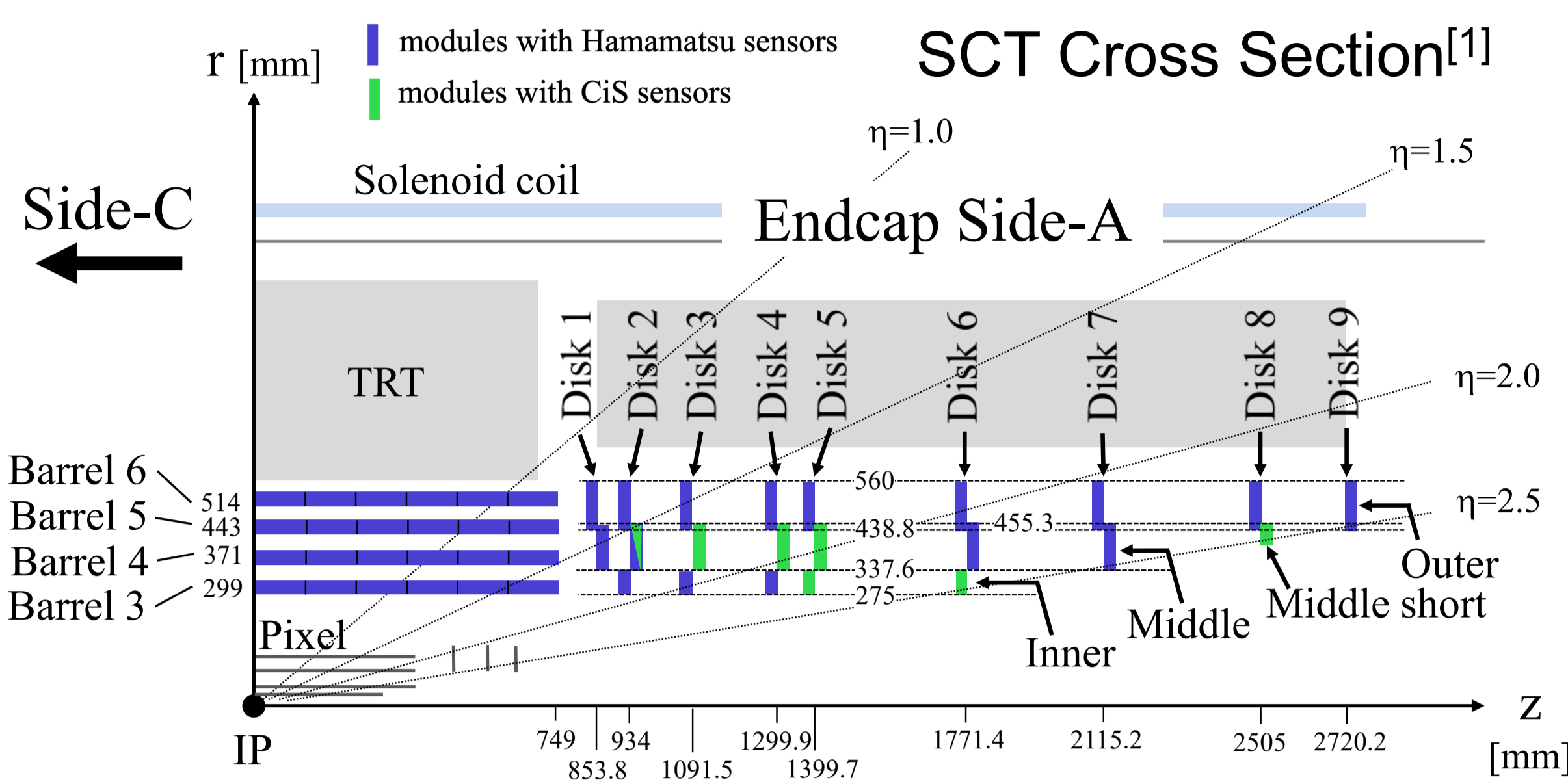


Performance of the ATLAS Silicon Strip Detector with improved calibrations

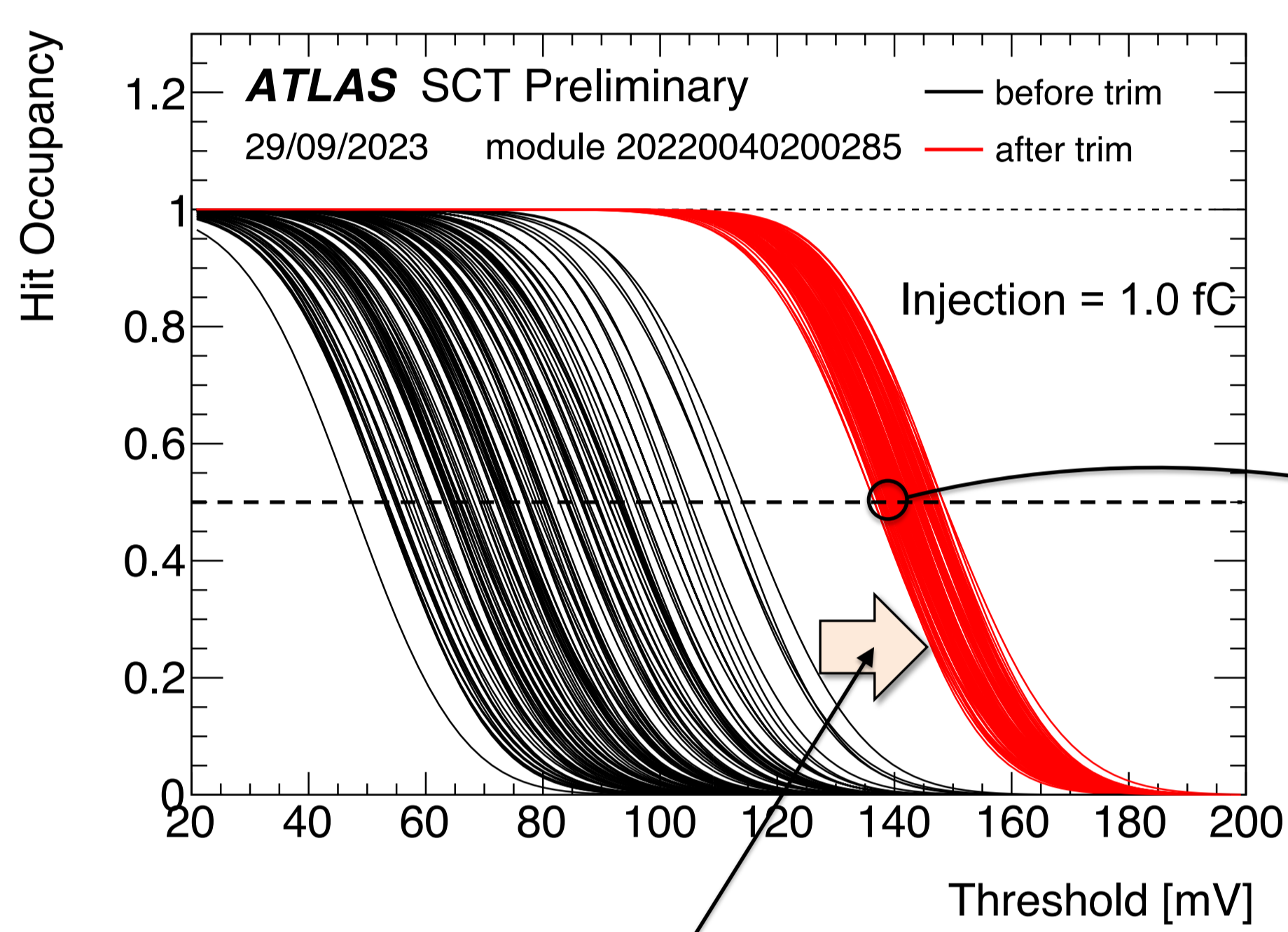
Semi-Conductor Tracker, SCT

- The **micro-strip detector** for precise tracking in ATLAS inner detector
- SCT modules have been continuously exposed to radiation during LHC beam operations since the start of Run1, so regular calibrations are vital to optimize the SCT configuration and the SCT hit efficiency



SCT Nominal Calibrations

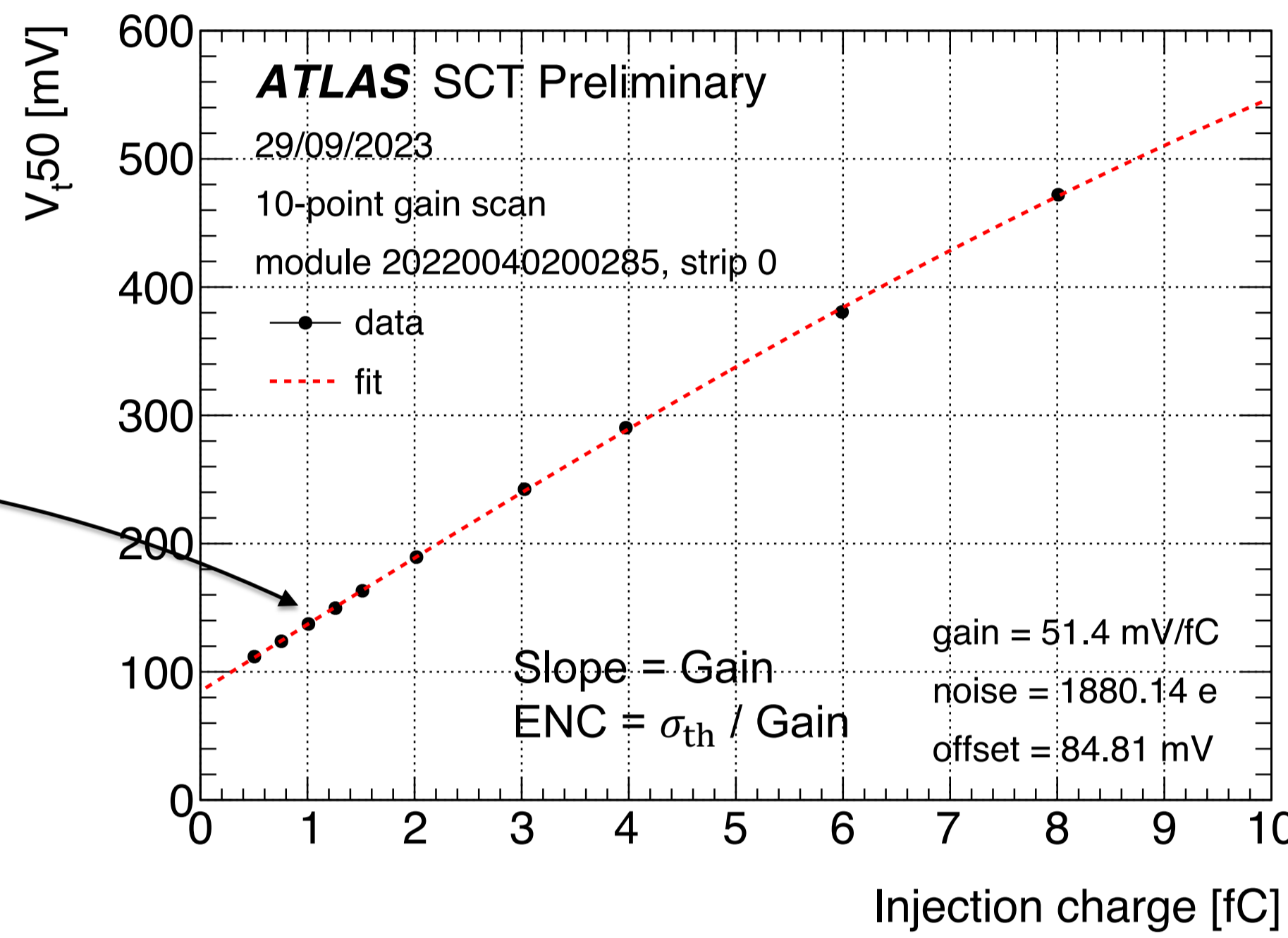
Threshold scan / s-curve



Trim Range scan

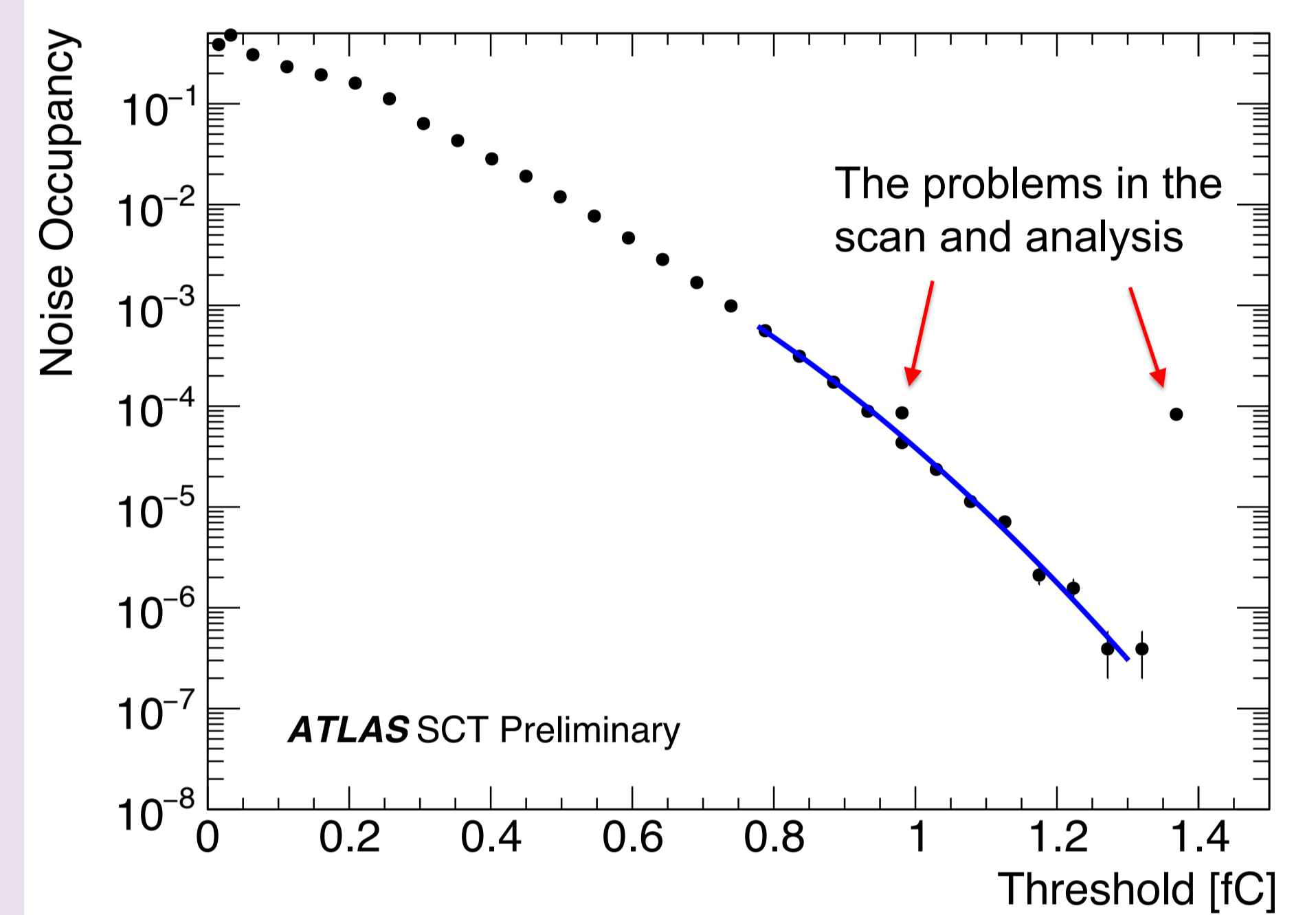
- Trims the detector response with the offset of the threshold, bad strips are **masked**

N-point Gain Scan / response curve



- Repeats the threshold scan in each injection charge
- Bad strips are **marked as "bad strip"** with the corresponding defects

Noise Occupancy Scan

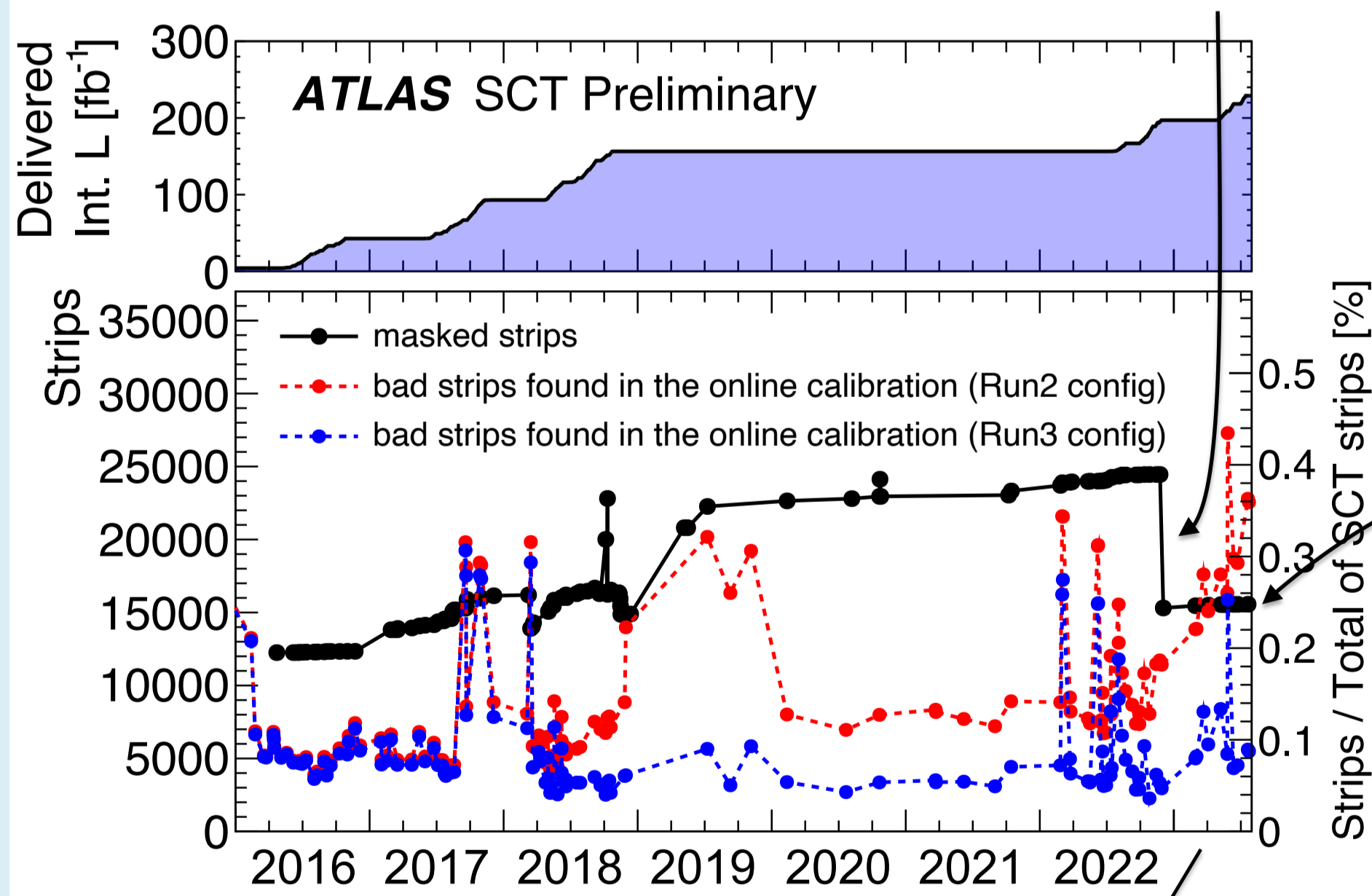


- Measures the hit occ. w/o charge injection
- Each point corresponds to the integral of the Gaussian tail of Noise distribution
- ENC is evaluated by fitting the tail

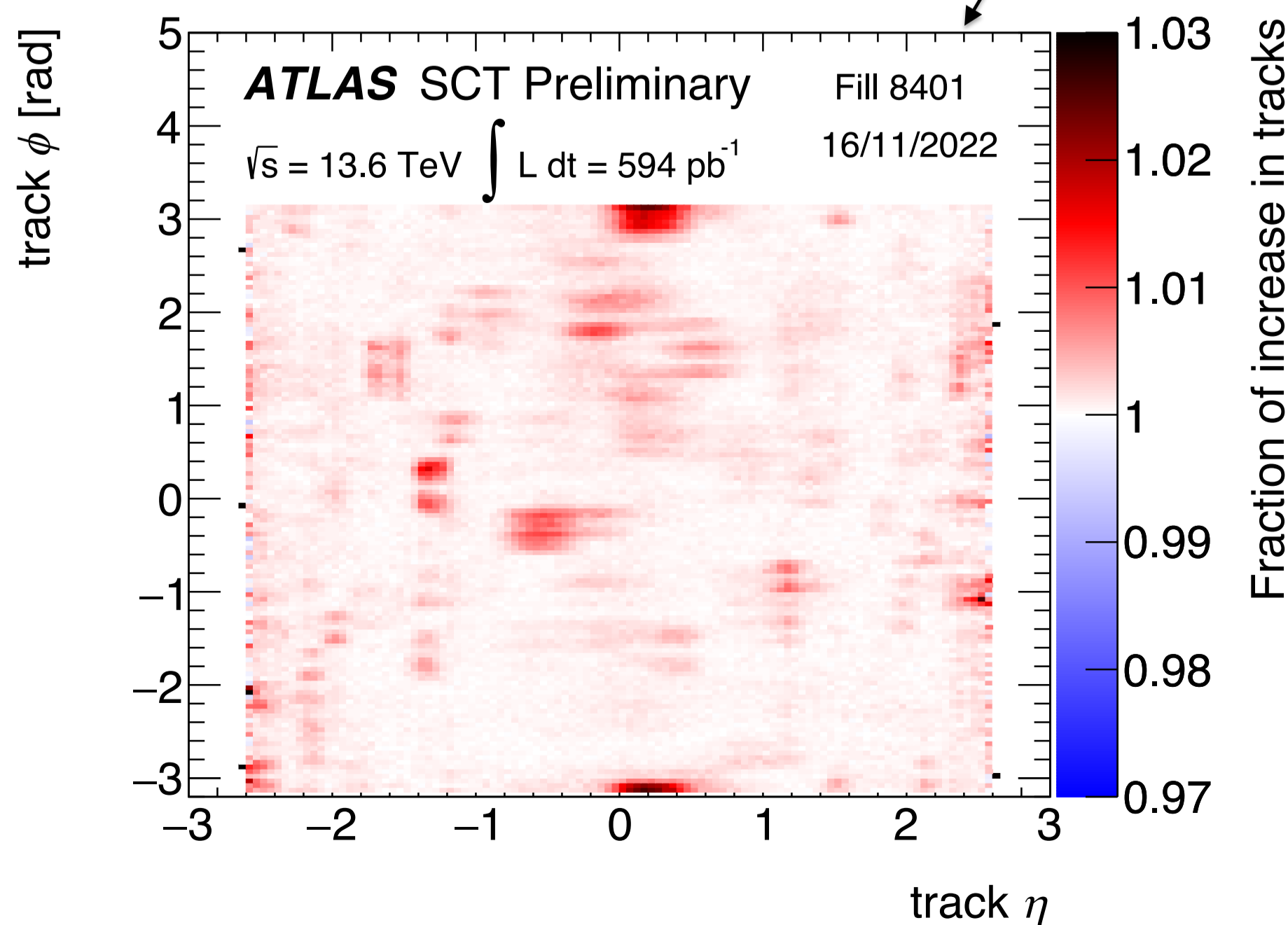
Calibration Updates

The analysis algorithm was too overly constraining in its definition of bad strips, and unnecessarily masked functional strips

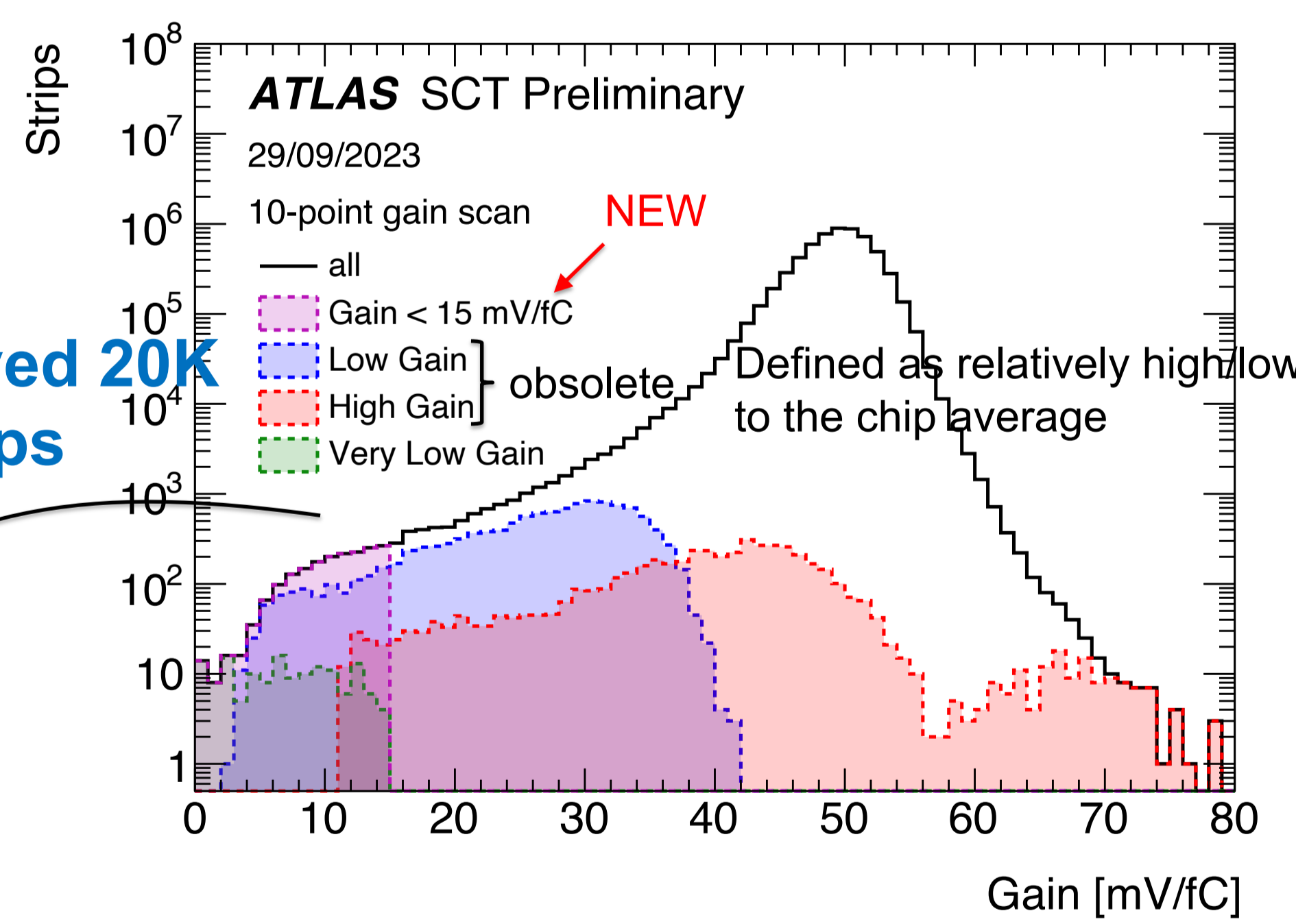
- Re-calibrated all strips including masked strips and **unmasked 10K healthy strips**



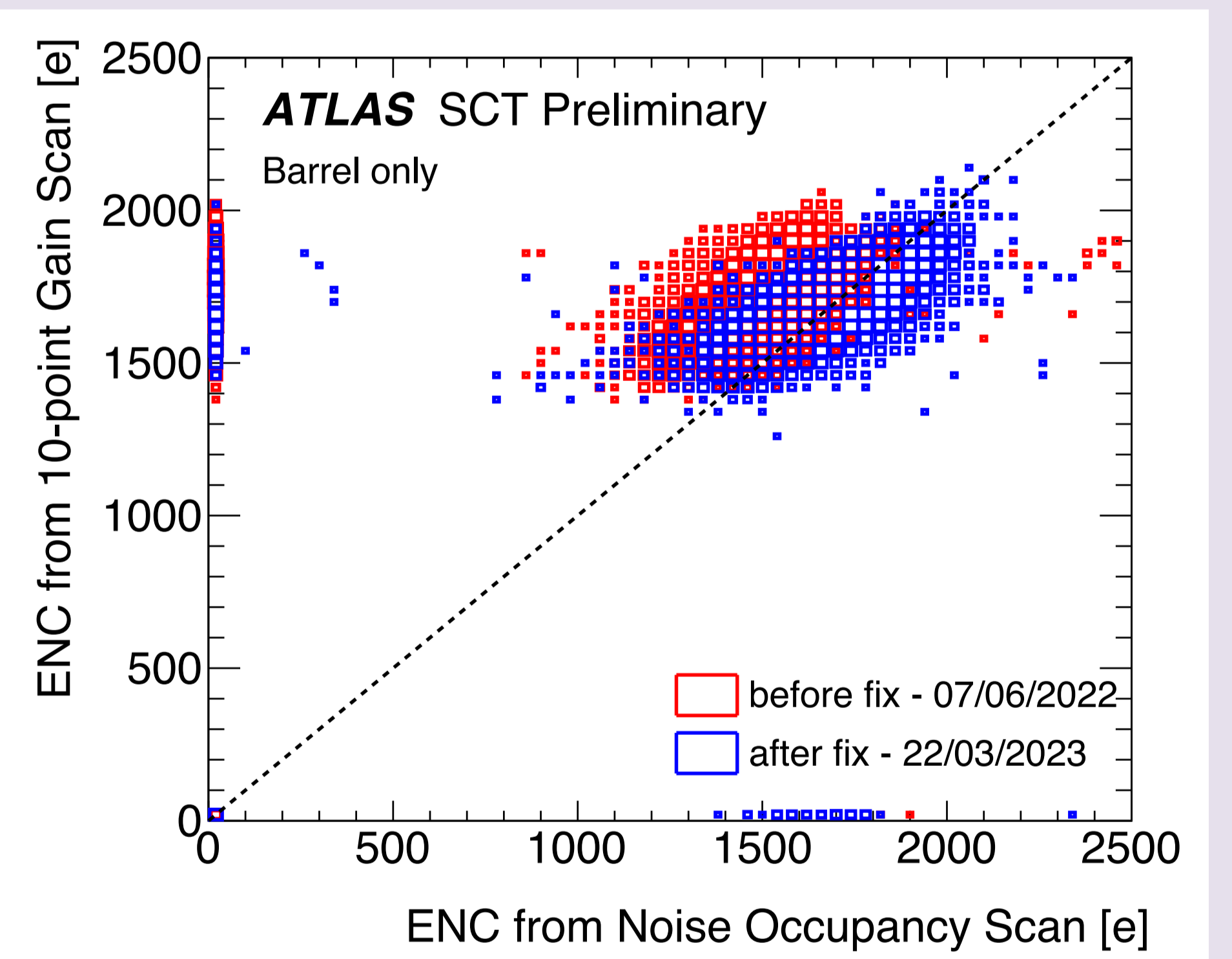
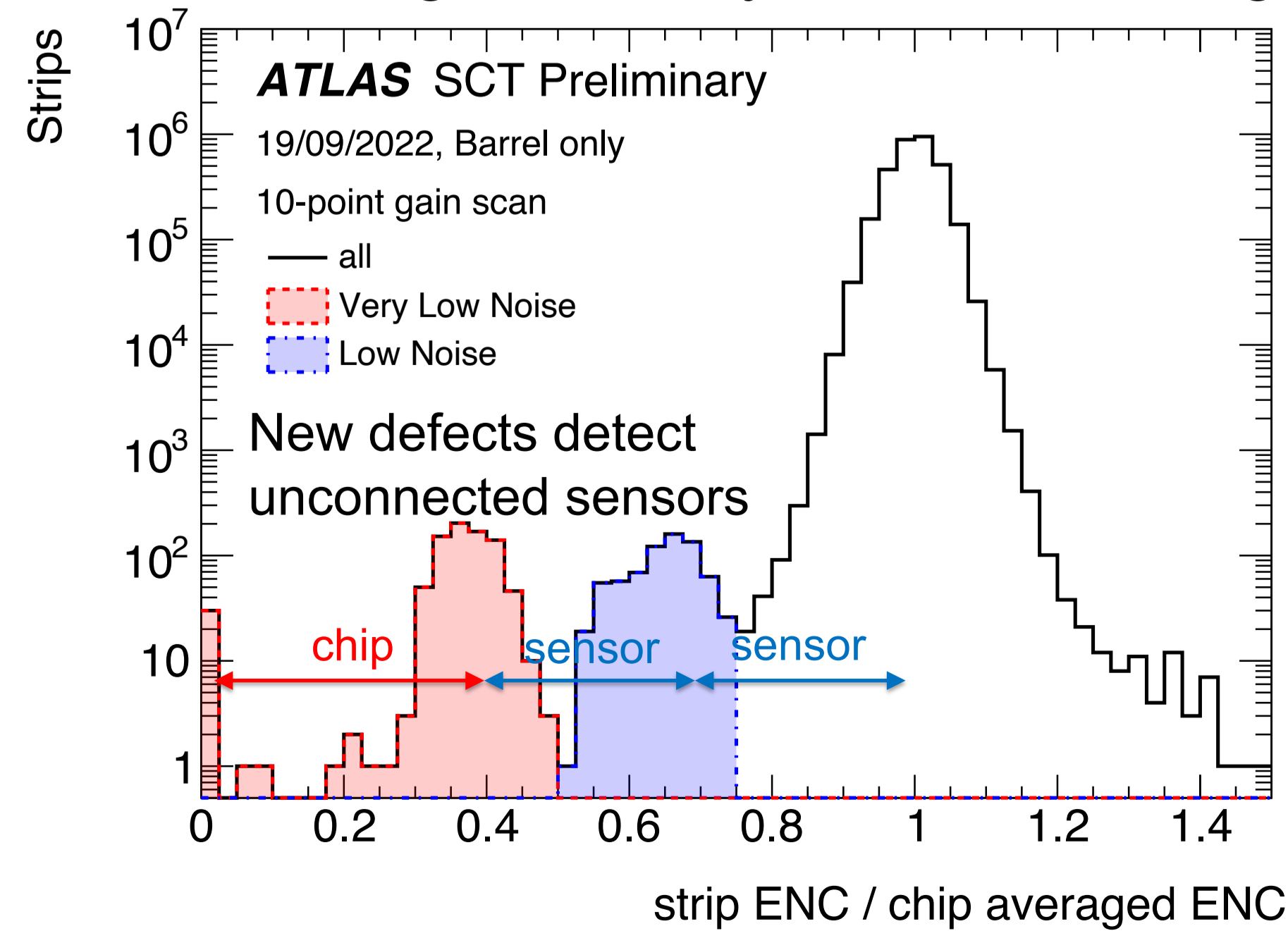
Impact of changing the criteria on the number of tracks



- Reconsidered criteria for assigning defects



- New defects using relative ENC are robust for increasing in ENC by radiation damage



- Fixed the bug caused by "int" or "float"
- Updated the fit function
- Regain consistency in estimates between N-pt gain scan and noise occupancy scan

Summary

- Fixed the problem in the calibration software and inflexible algorithm
- Reconsidered the criteria for the bad strips
- The implementations of new features saved ~20 modules in total
- Succeeded in building more robust calibrations towards the end of LHC Run3

The full functionality of the SCT can be expected until the end of Run 3