

# **sTGC High Voltage Investigation Update**

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*25/07*

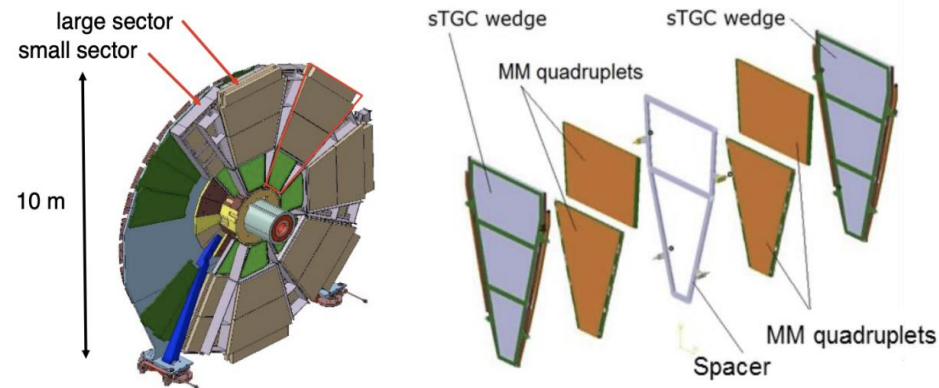
# Recap

## Project Motivation

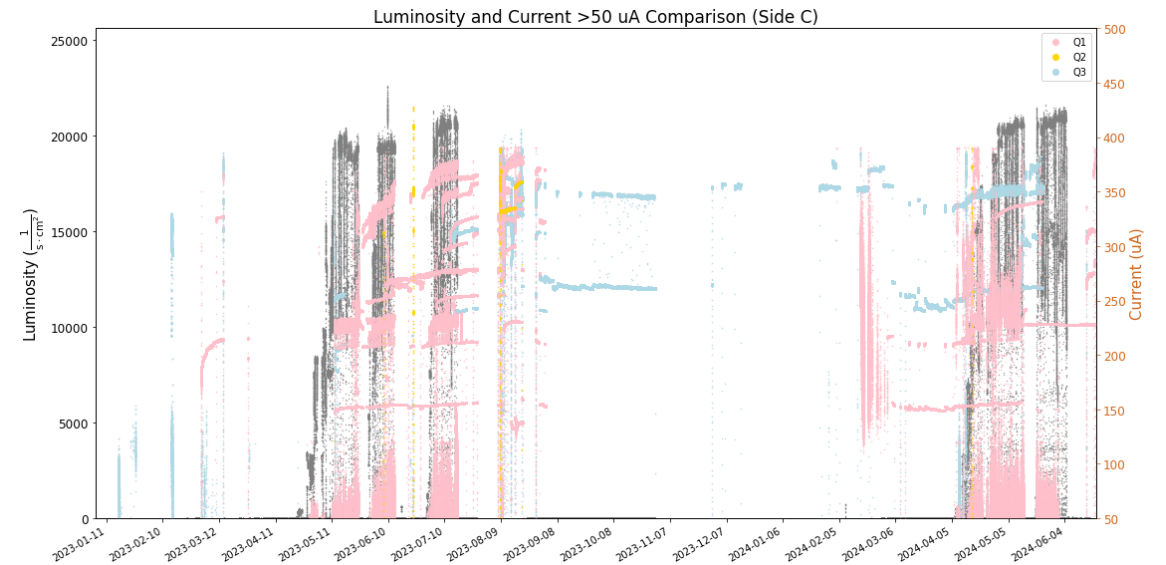
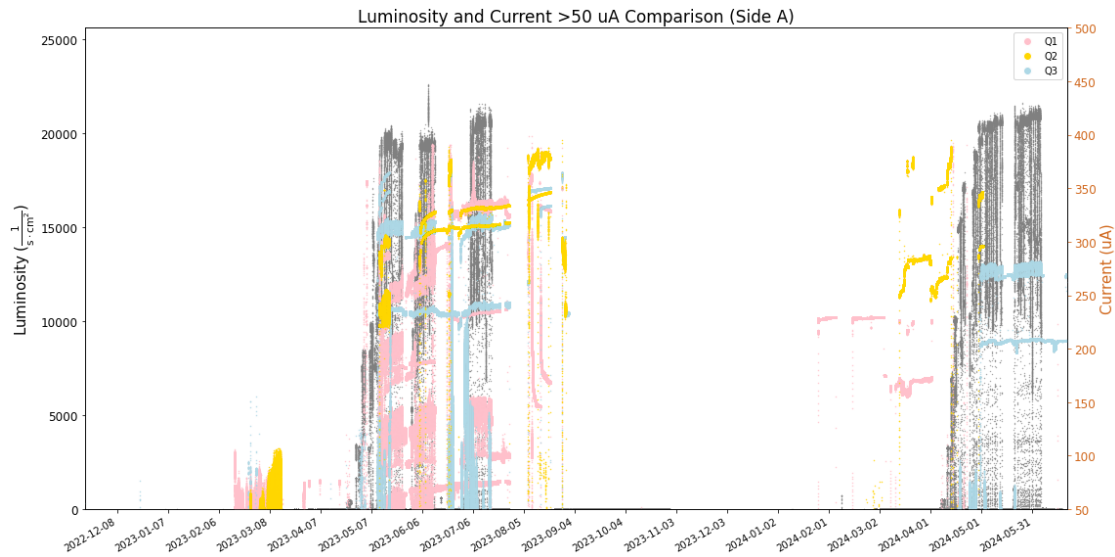
- The Small Thin Gap Chambers (sTGC ) in the New Small Wheel (NSW) are failing/dying at a fast rate
  - This is evident in spikes in current, dead channels, etc.
  - This affects data taking, reliability and overall efficiency of the detector

Goal (as my supervisor put it): Help!

- Visualize the problem
- Find any patterns that might clue us towards what is happening within these chambers



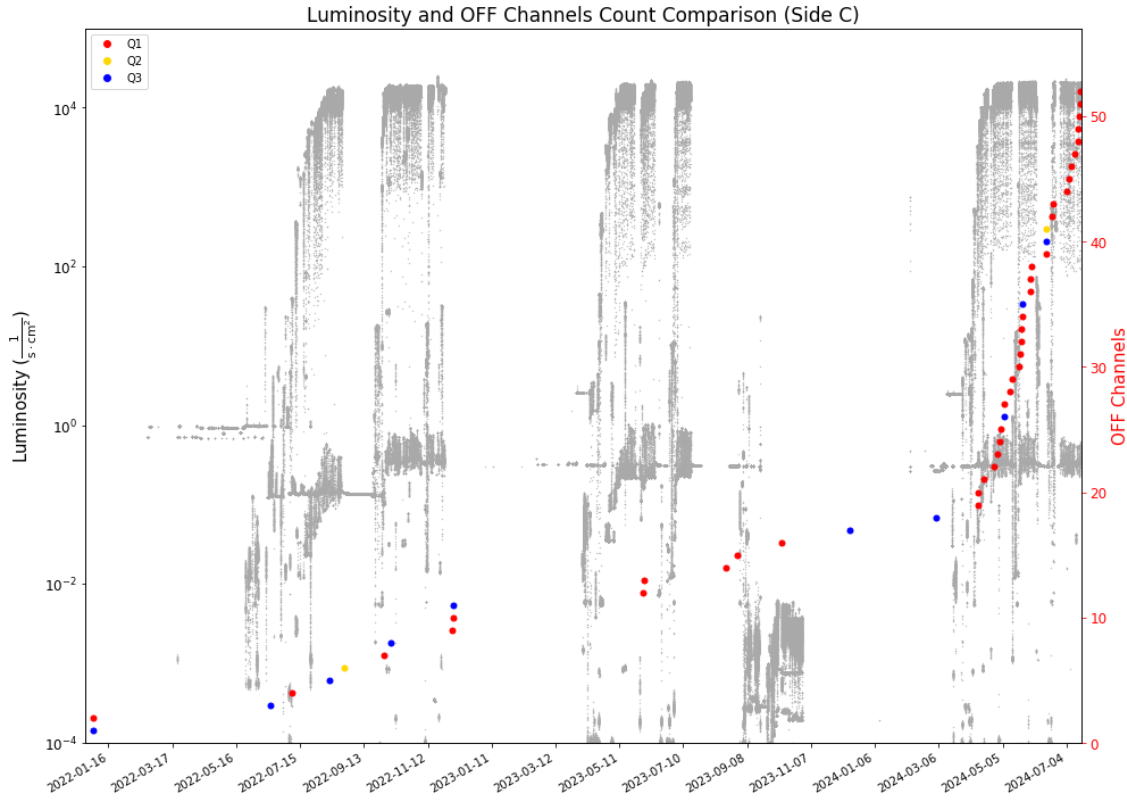
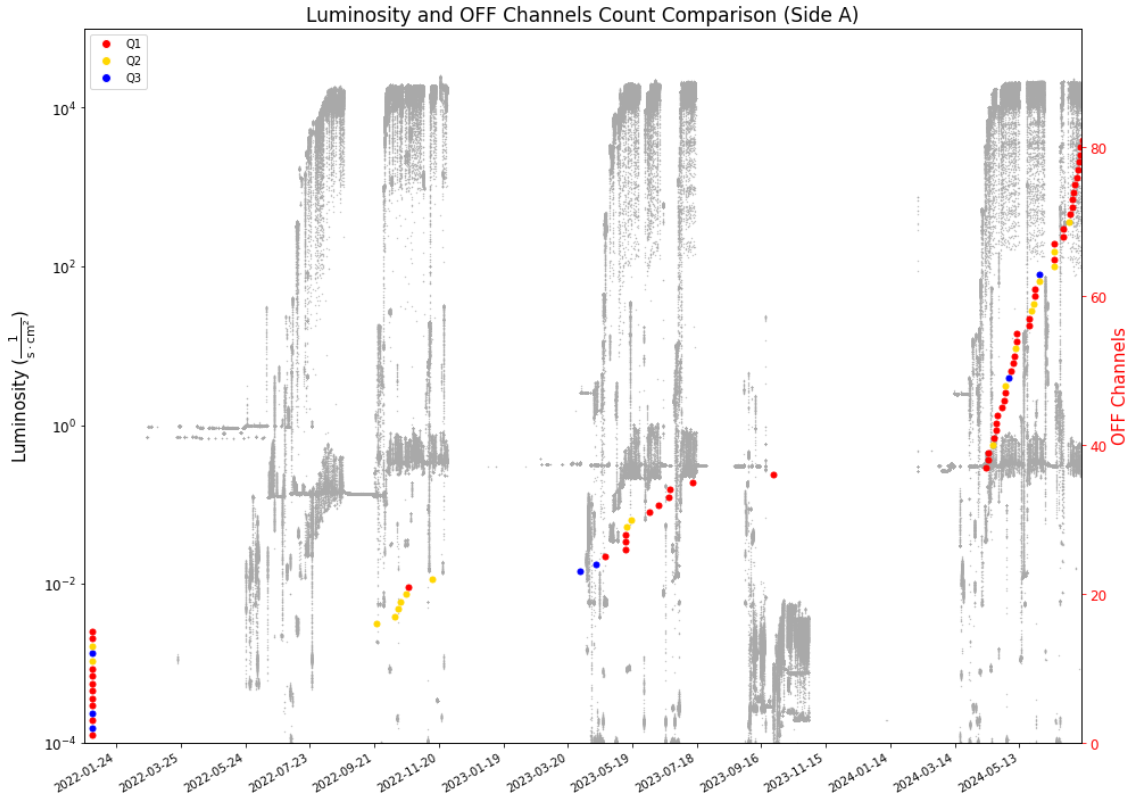
# Previously



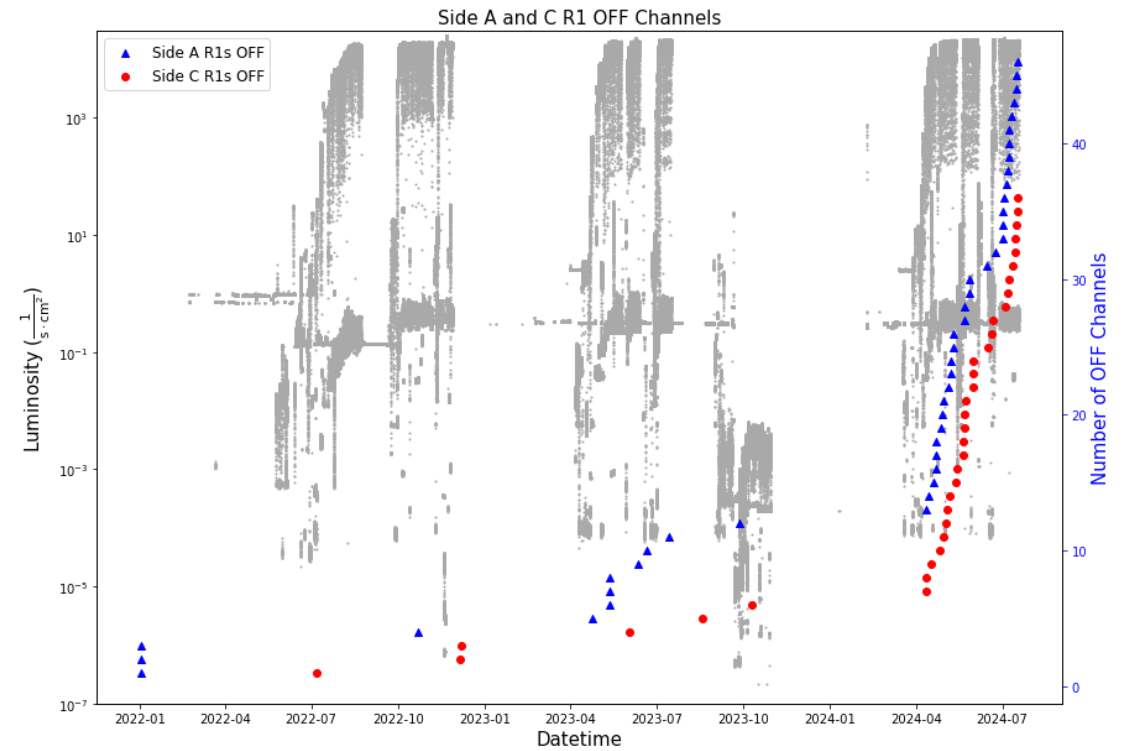
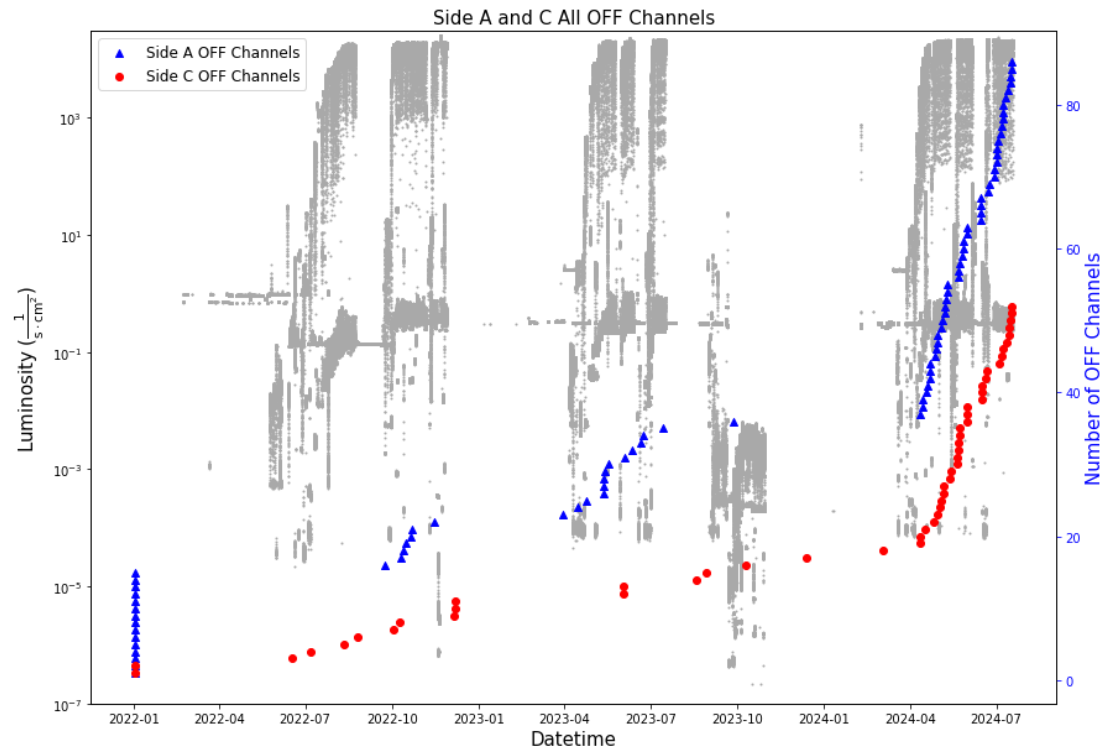
- Wanted to take a look at current spikes and luminosity correlation for channels that were experiencing abnormal behavior
  - This type of plot became too messy/hard to pick out a pattern
  - More interested on an individual level

# Different Approach: OFF Channels and Luminosity

- OFF Channels Side A and C
  - Voltage data from data viewer
  - Look at when channels turned OFF and stayed OFF, i.e. the last instance of 2000 kV
  - Log plot of luminosity to visualize heavy ions which run at much lower luminosity than normal



# Side A and C Comparison



## What can we infer from this?

- Side A has more problems, but the large difference in OFF channels looks like a contribution from the beginning of construction (not necessarily a difference within it's position in the detector)

## Why R1's?

- R1's are closer to the interaction point and run at higher voltage --> mo' voltage, mo' problems

# Other Hardware/Operations Activities



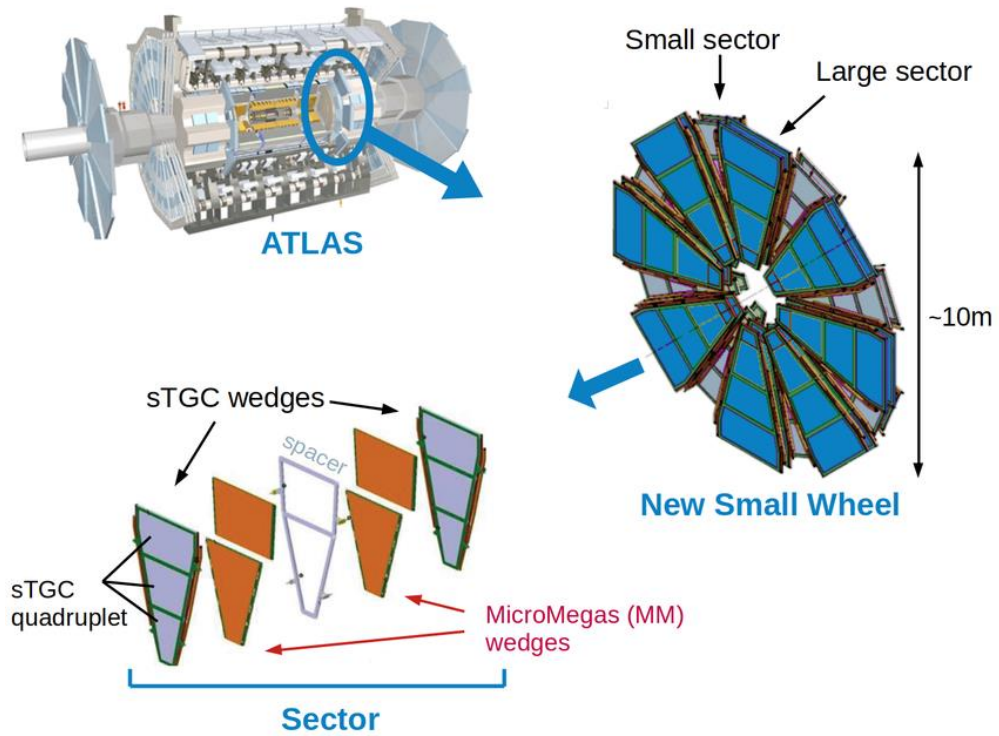
ATLAS Control Room



ATLAS

# Challenges

Accessibility is very difficult based on the position of the sTGC's in the detector



# Next Steps

## Short-term

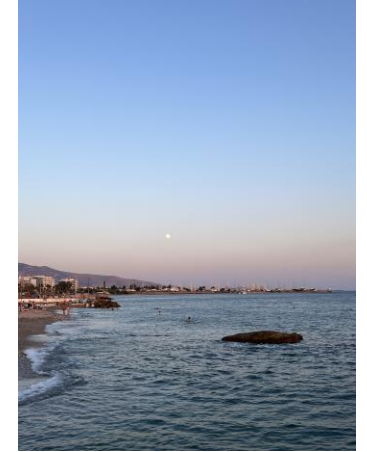
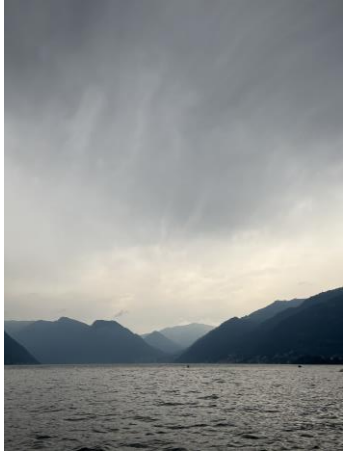
- Look at total integrated luminosity vs OFF Channels
- Look at current spikes on an individual level for OFF channels, and plot them with the current limit to visualize behavior before failure
  - If this shows an obvious pattern, perhaps we could make predictions about healthy boards/take preventative measures
- Repair high voltage boards suspected to be damaged in the cavern

## Long-term

- Long term radiation testing for spare chamber
- Efficiency scans at different voltage values



# Adventures so far...



Milan/Lake Como, Italy

Chamonix, France

Athens, Greece