

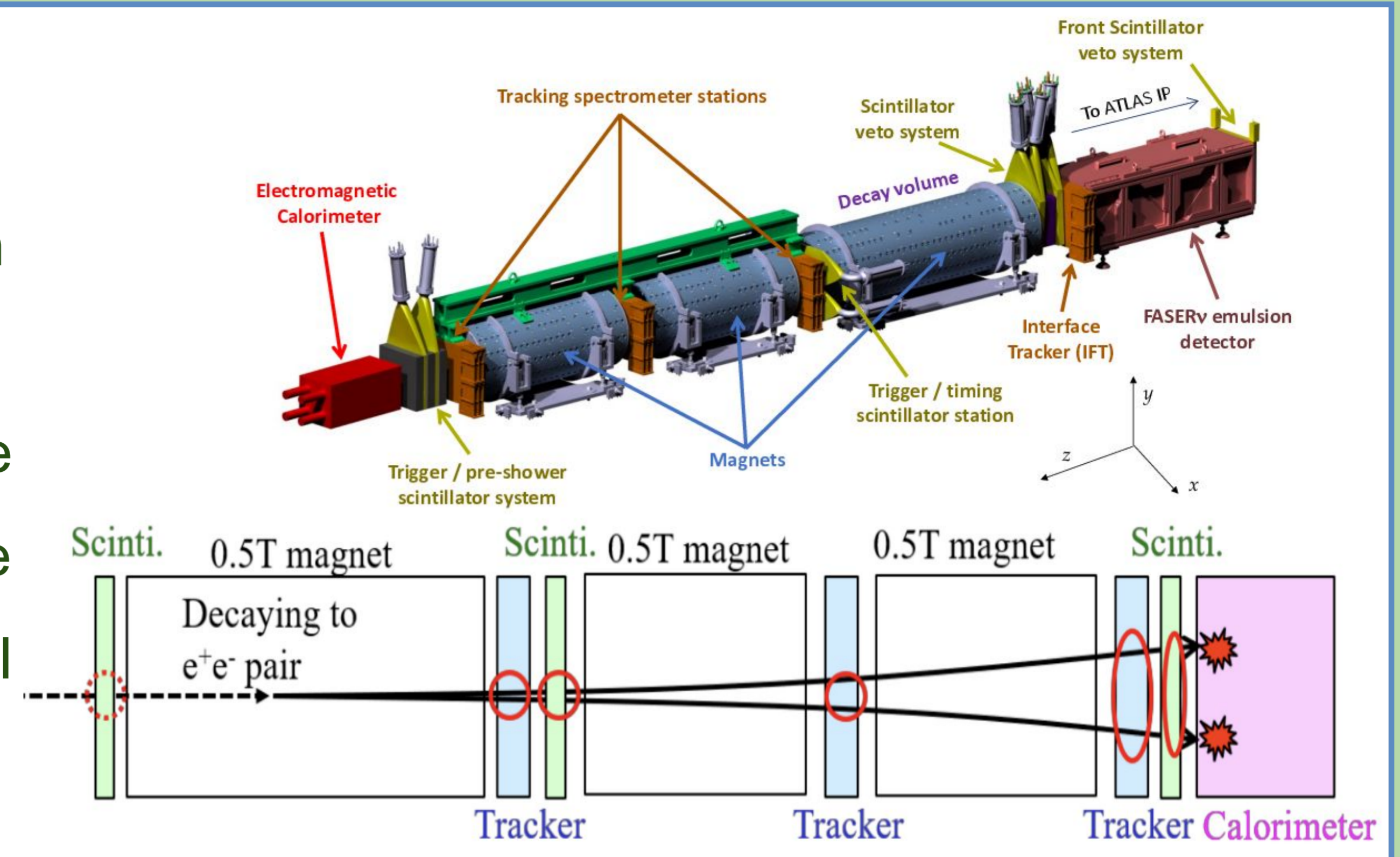
Performance Studies with the FASER Detector for LHC Run3 Data

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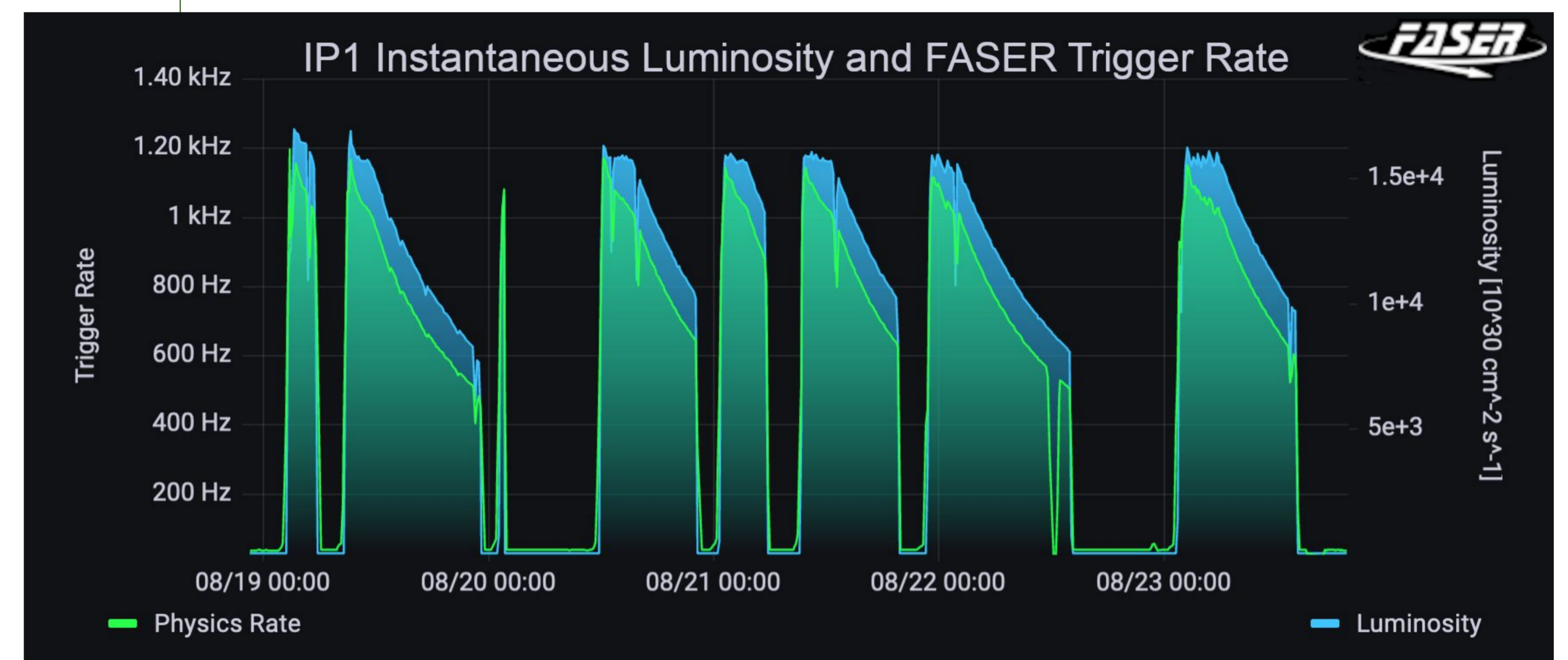
Faser Experiment

- The ForwArD Search ExpeRiment (FASER) at the LHC is aligned with the collision axis in ATLAS, 480 m away from the collision point.
- Its design is optimized for the search of Long Lived Particles (LLPs) like dark photons decaying into two charged leptons. Those particles are advocated to be the portal between the Standard Model (SM) and a still undiscovered hidden sector.

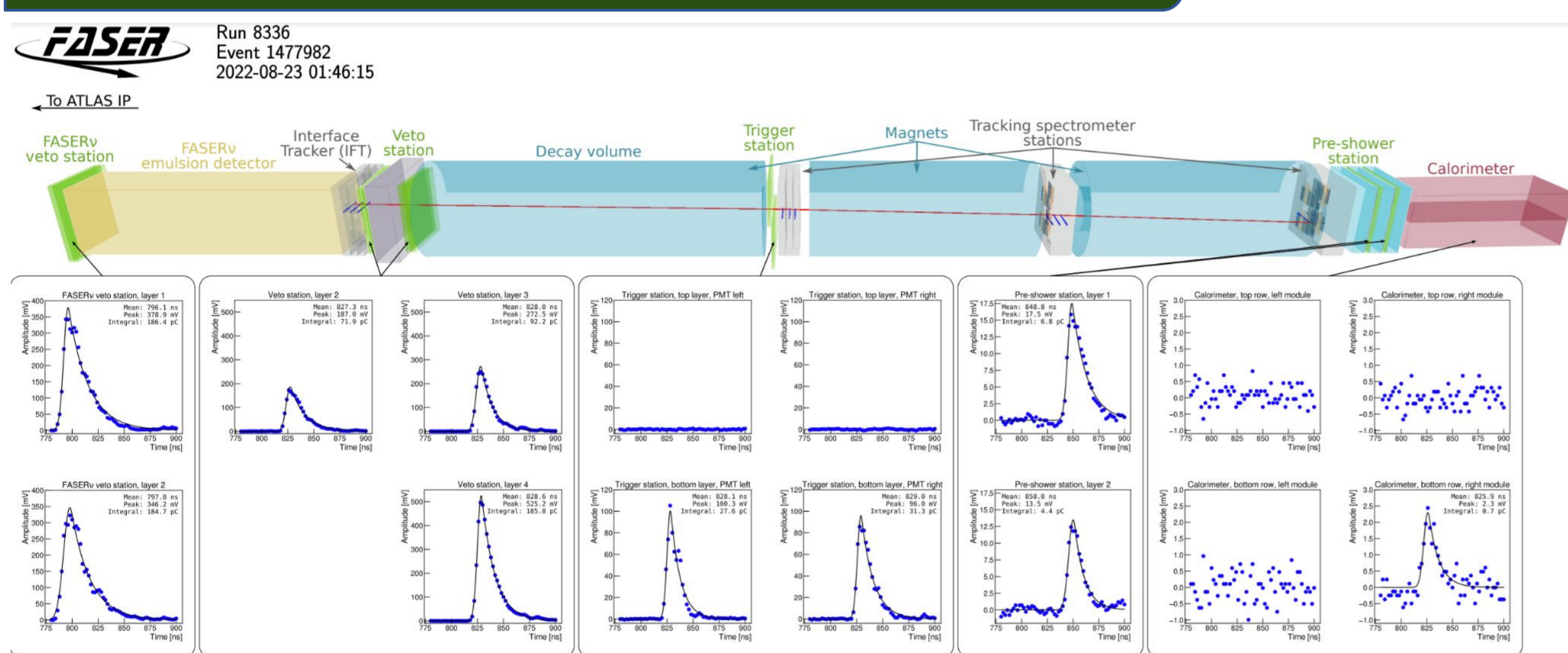


FASER Operation

- FASER has been successfully collecting 13.6 TeV collision data since July 2022.
- Over 35/fb of data have been recorded, and many performance studies are ongoing.
- Currently only 850/pb (<2.5% of full dataset) data lost due to operational issues.

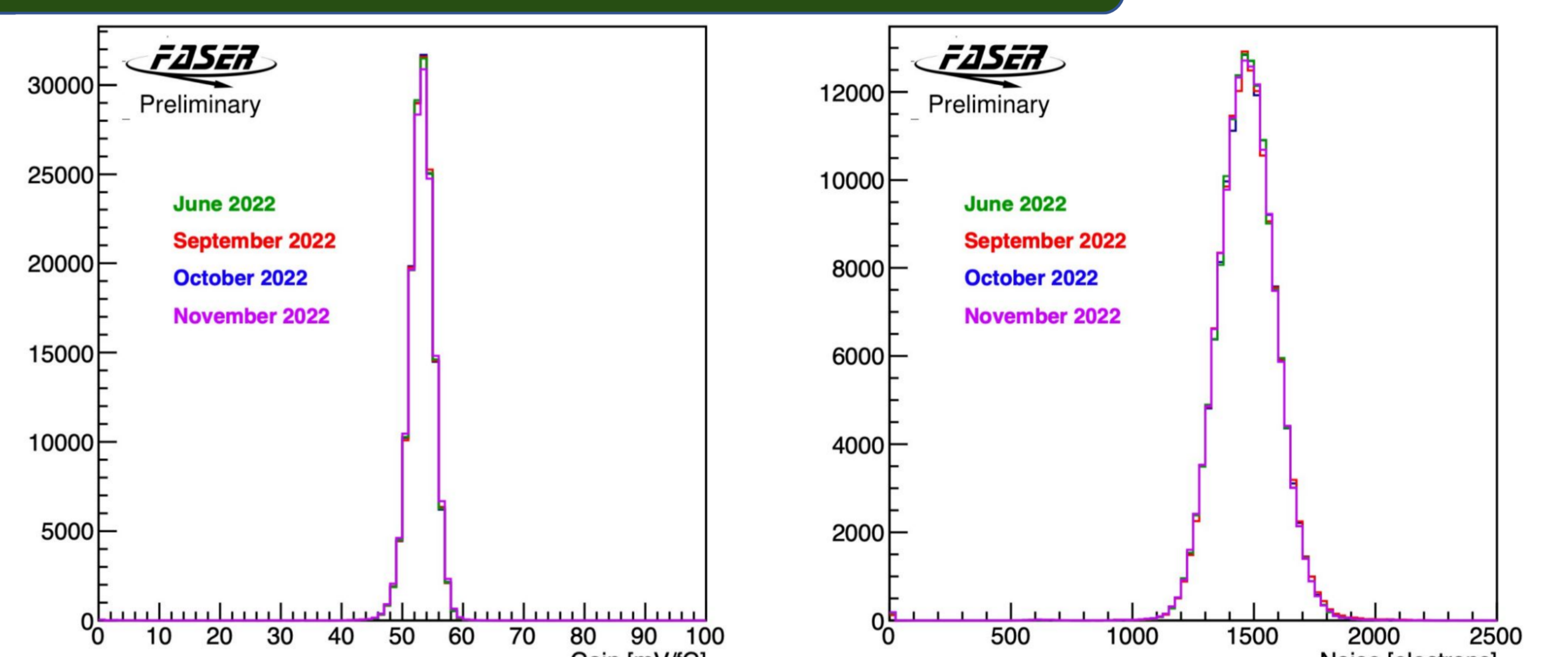


Event Display for Run 3



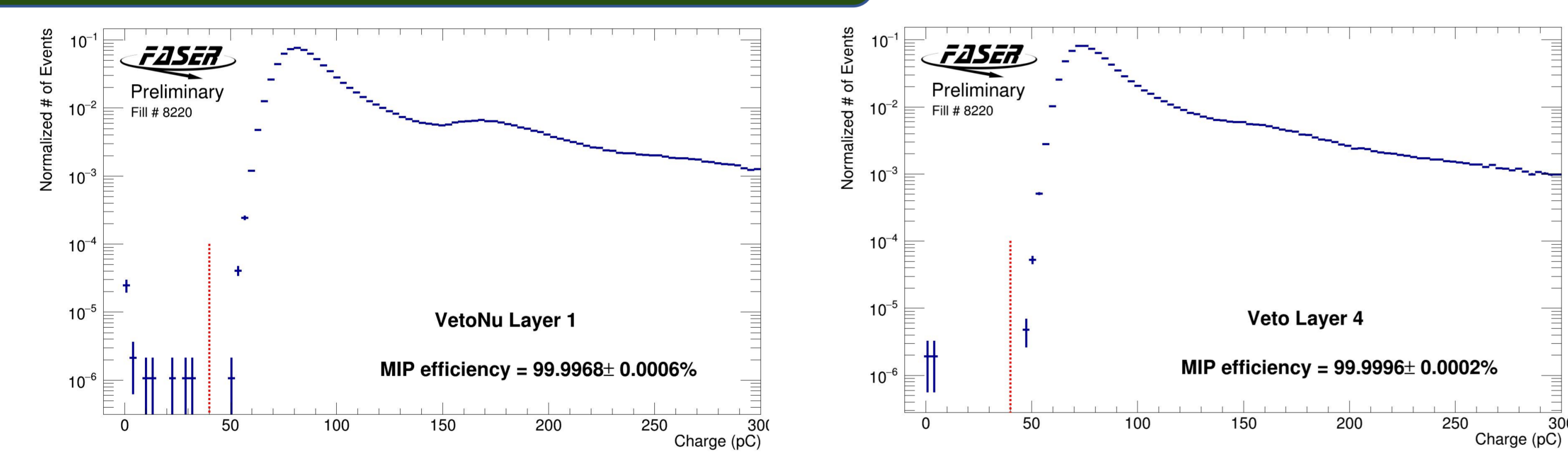
Collision event with a muon traversing FASER. MIP signal seen across the detector.

Tracker Studies



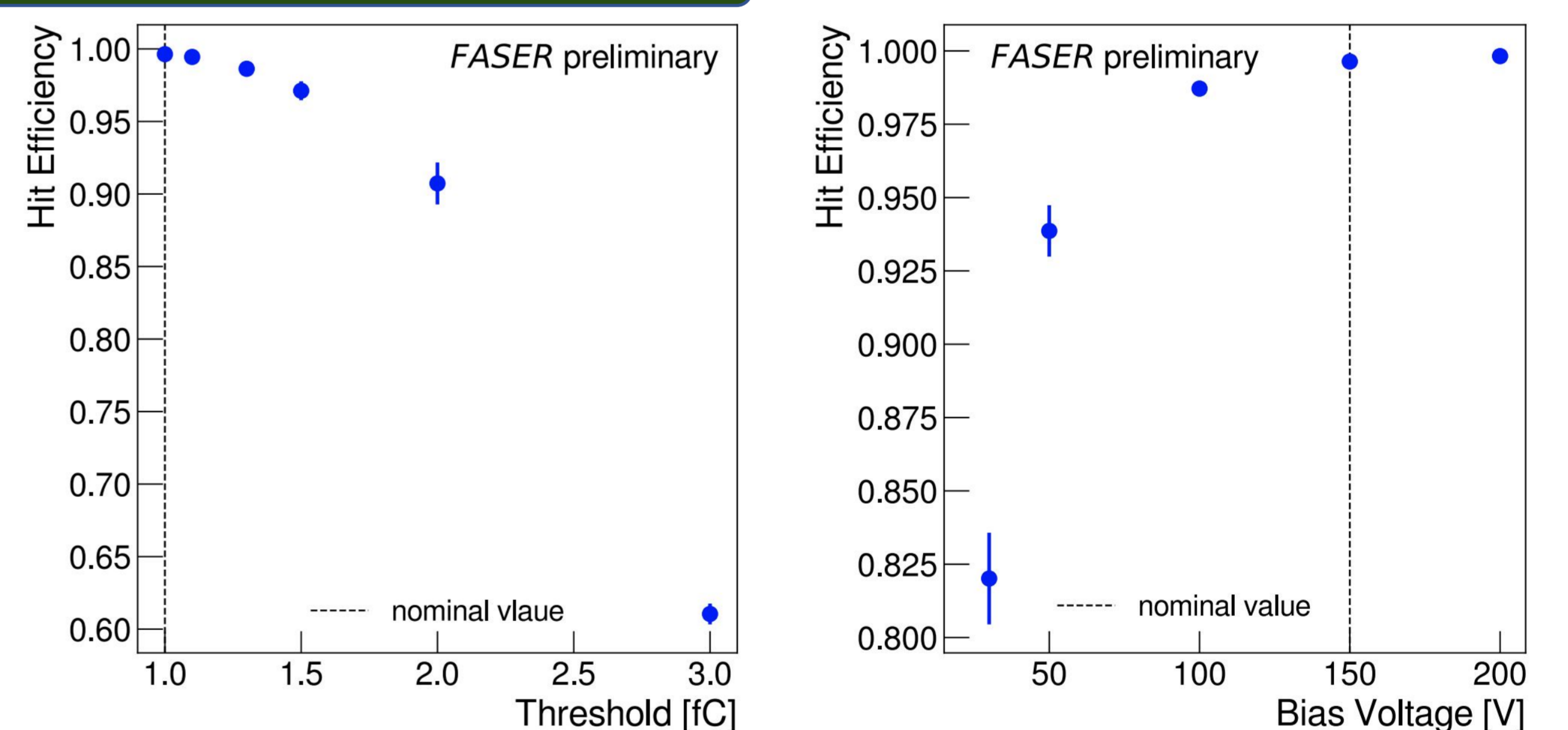
Tracker performance seen to be stable throughout the year and only less than 0.1% of the tracker channels are noisy.

Scintillator Studies



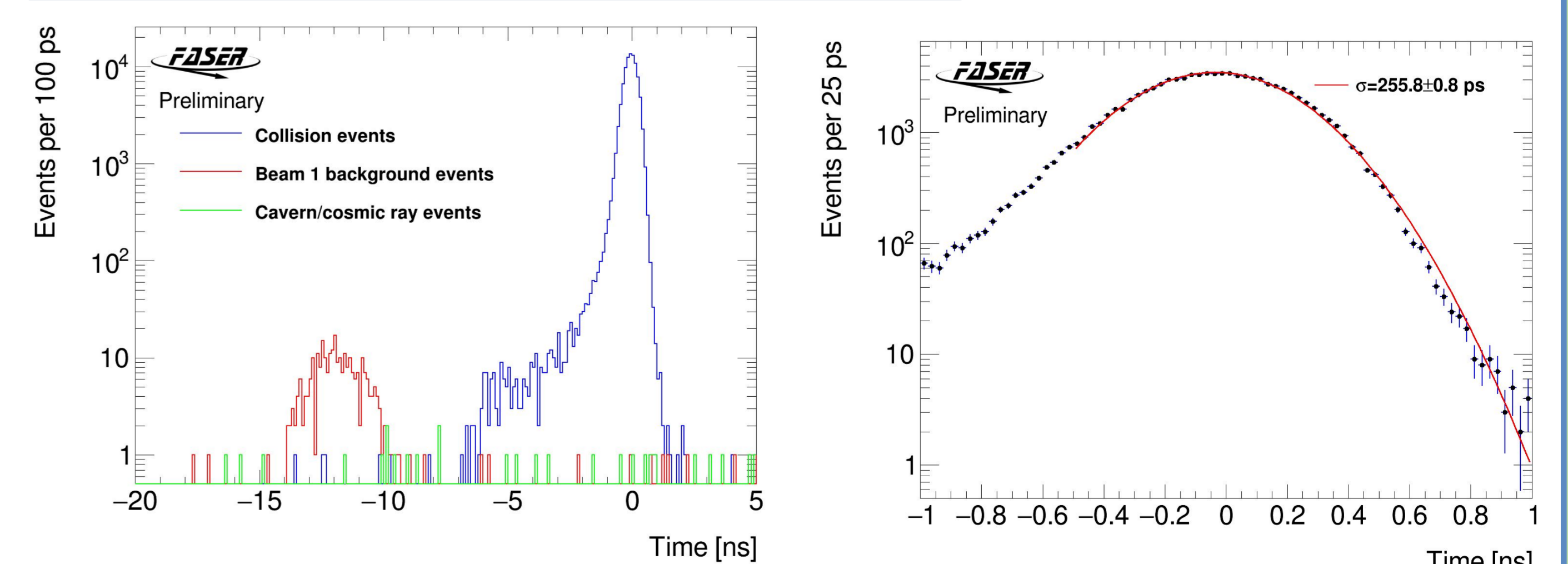
- Each scintillator has an efficiency of >99.99%.
- When 4 scintillators are combined we can veto the $\times 10^8$ expected muons entering the detector in Run 3.
- The noise (0.15 pC) we see is much less than the MIP signal (about 70 pC).

Tracker Studies



Tracker hit efficiency as a function of threshold and bias voltage, measured in collision data. We see a very high efficiency of >99.6% at our nominal settings.

Calorimeter Studies



Timing resolution in the calorimeter is very good, to the point that we can easily distinguish collision events from beam background.

Summary

- Physics Data taking started since Run 3 and we have seen excellent detector performance!
- First Physics results are expected in the first quarter of 2023.

