

Trigger rate studies with LST-1 prototype

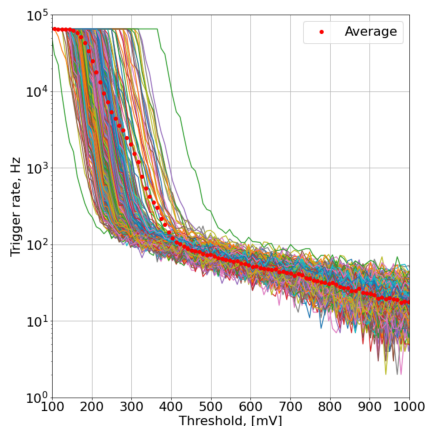
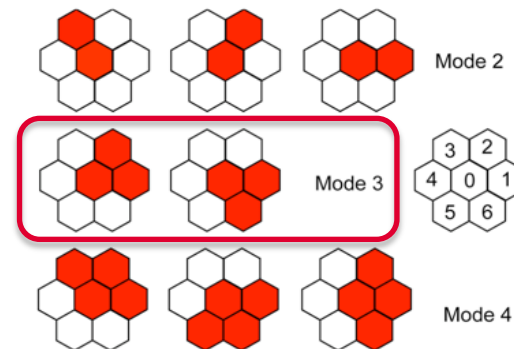
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Camera trigger logic and data processing

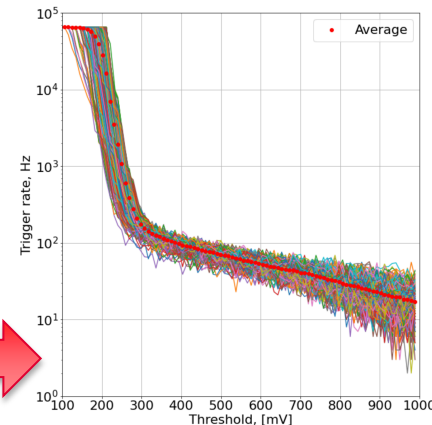


- Pixels are grouped in modules, 7 pixels in each module
 - $1855\text{pixels}/7 = 265 \text{ modules}$
- Trigger sector is formed as a combination of neighboring modules
 - Mode 3 is currently used
 - 474 trigger sectors are considered
 - Only modules where both "tri-up" and "tri-down" combinations are present will form trigger sectors



- Trigger rate scan is produced individually for each sector
 - During the scan of one sector, thresholds on all other sectors are set to their maximum
- Each sector has an individual offset which must be accounted for
 - Find the "knee" point for each sector and shift the rate curve along the threshold axis to the average value of "knee point"

account for offsets



Data/MC comparison and summary



- Cosmic ray-induced showers simulation:
 - Diffuse protons simulated with CORSIKA
 - Shower-telescope simulation is done with sim_telarray
 - Differential trigger probability is computed as a function of primary particle energy and convoluted with the measured cosmic ray spectrum
 - On top of this, night-sky background simulation is added
- Data and simulation shows very reasonable agreement in entire range of trigger values
 - Small discrepancy is observed at trigger threshold above 500 mV
 - This is caused by a limited statistics of such high-energy events both in data and simulation
 - This discrepancy is well within the statistical errors

