



# L1Calo Rate Monitoring

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- What is available now
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- Tools
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# Requirements and Rationale

- Track changes in rates (eg with luminosity conditions)
- Watch for beam problems (eg FCAL hotspots?)
  - Preprocessor rate metering and histogramming
- Diagnose problems in the trigger itself
- Shift the blame (if appropriate!)
  - Some problems with trigger rates going wild might be due to sudden hot cells or hot areas in the calorimeters. Would prefer to have the calorimeter experts called at 3am and let L1Calo experts sleep...
    - Need good tools, documentation and training
- Require display of instantaneous rates and history
  - At system level and at finer granularities



## What is available right now

- Nothing...
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- But rate metering (and histogramming) of every trigger tower is implemented and tested on the Preprocessor ASIC
  - Still needs firmware and software development

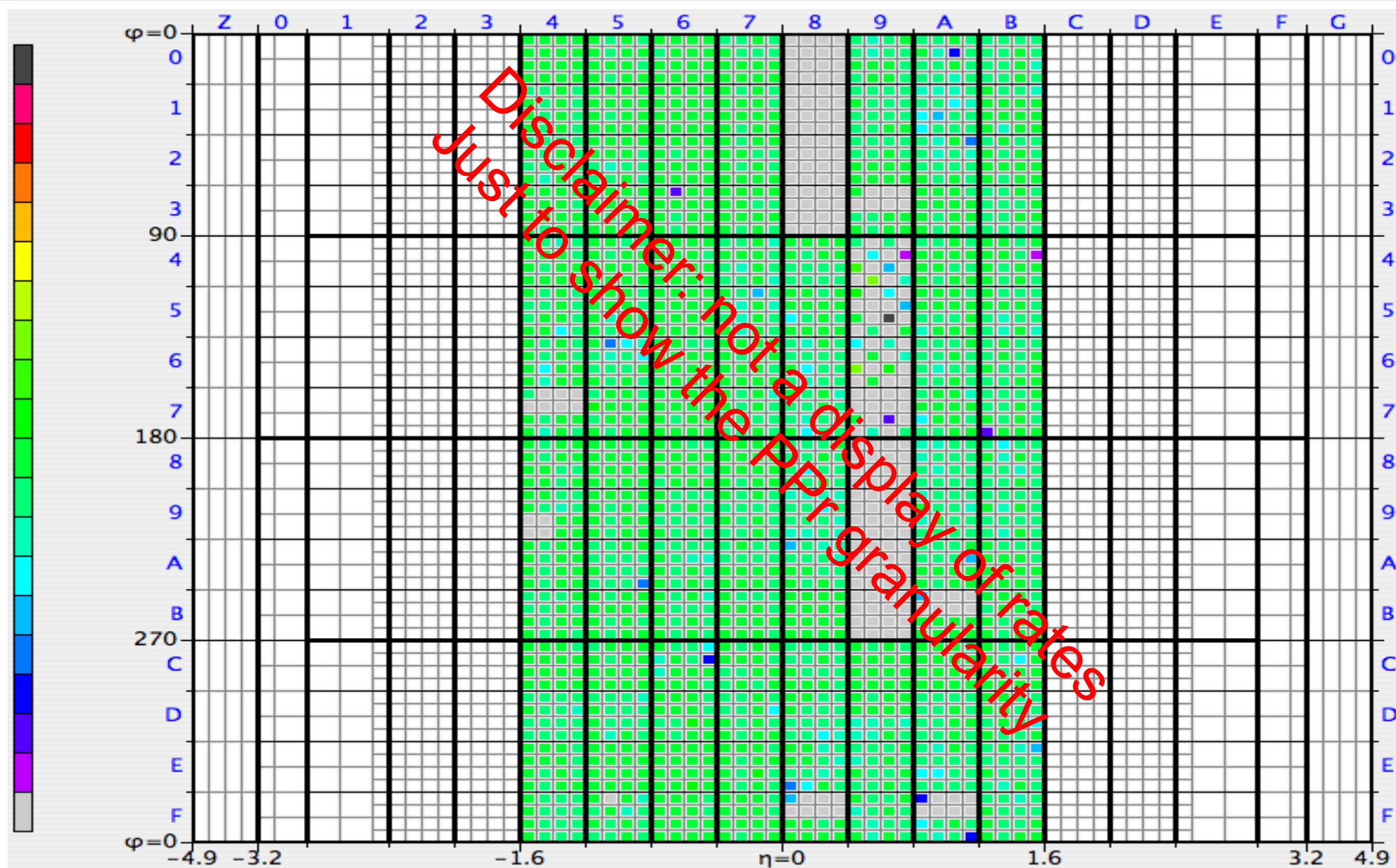


## What is planned (1)

- Three granularities of rate monitoring:
- Rates from whole L1Calo system (in system CMM)
  - Roughly a duplicate of what we send to the CTP
  - Rates of  $\geq 1$  object for all e/gamma, tau & jet thresholds
  - Rates of each missing  $E_t$ , sum  $E_t$  and jet  $E_t$  threshold
- Rates from each CP/JEP crate (in crate CMMs)
  - Rates of  $\geq 1$  object for all e/gamma, tau & jet thresholds
  - Granularity: phi quadrants (CPM) or two quadrants (JEM)
    - No eta division in current proposals(?)
- Rates of every trigger tower (above low threshold)
  - About 7200 towers, also with energy spectra histograms
- Publish all rates to IS every few seconds
  - PPr histograms less often



# Granularity of PPr Trigger Towers





# Implementation Status

- PPr rate metering well tested at ASIC level
  - Firmware to read the ASICs is under development
  - Software (run controller) still needs to be written
- Rates from CMM only proposed recently
  - Firmware specification written
  - Aim for implementation by the end of this year
- No work on display tools yet



# Tools

- Would like to present rates at all granularities
- Be able to navigate from system level down to individual tower level
  - Also from tower rates to associated histogram
- Also want to see history plots
  - At least for the higher granularity plots
- Existing trigger presenter (TriP) is an OHP plugin
  - Does this easily allow “one click” connection from rates displays to histograms?
  - If so, this might be a good basis for a common tool
- May also require other custom/expert tools
  - Eg hot cell killer with link to database?



## Summary

- Rate monitoring from L1Calo at three different granularities is coming soon...
- Interested in common presentation tool
  - Especially if it can provide links to histograms