CSCTF Status for 2011

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- Hardware status (spares and stability)
- Firmware status
- Latency status
- Emulator
- Problem during data taking
- Conclusion

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Hardware status

✓ CSCTF SP boards:
  - 12 in the system at Point 5
  - 3 working spares at 904
  - 3 working spares at UF
  - 3 broken spares at UF:
    • they have disconnected corner balls in large FPGAs
      because of mechanical deformation of the board in the past
    • they are under rework currently

✓ DT transition boards:
  - 12 in the system at Point 5
  - 7 working spares in CERN
  - 1 working spare in UF

✓ DDU extender boards:
  - 1 in the system at Point 5
  - 2 working spares in CERN
  - 1 working spare in UF

✓ Last time SP board was changed at May 2010 and June 2009.
   Finally it was appeared that SPs were fine in both cases.

➔ We have very stable hardware for CSCTF

Firmware Status

✓ Last change of the firmware 30.03.2011:
   new SR LUTs to fix inefficiency at endcap minus for η < -2.1

✓ Last change of the PTLUTs 10.05.2011:
   possibility triggering where ME1/1a chambers are dead

✓ During power cut or switch off/on CSCTF crate we usually lost firmware
   because some EEPROMs on our boards are defective,
   certain bits in them periodically get reset to incorrect values.
   FPGA in such case fails to configure.

   - Last time we lost firmware 12.07.2011 due to power cut at Point 5

➔ Stable CSCTF firmware,
   but need to check it every time after switch off crate for any reason

PTLUTs and Firmware Plans

✓ PTLUTs will be reviewed to the next year using selected data.
  Possible improvements of resolution and efficiency at high pt:
  - review Likelihood method: local maximum $d(Log(L))/dpt \rightarrow max(Log(L))$
  - try combine L2 method of pt assignment with L1
  - optimization dphi12 vs. dphi23 resolution for 3 station tracks
  - add eta window for 2 station tracks where CLCT pattern is useless

✓ Extra zero suppression data format:
  - DDU CSCTF couldn't handle rate of 105 kHz with current CSCTF data format.
    Buffer was full by 80% 4.10.2011 $\rightarrow$ dead time ~ 100 %.
  - 105 kHz is not L1 rate at which we suppose to run but if pile up increase we got
    events with average higher size
    $\rightarrow$ this error could appeared for lower rate for higher pile up (80 kHz??? or so on)
  - new data format should handle with such rate and more
  - Sept. Technical Stop it was tested $\rightarrow$ bug of data distortion is found
  - Our engineer fixes it and we are planning to test it during
    November Technical Stop at Point 5:
    need long cosmics runs during whole Technical Stop
  - planning to use new data format with extra zero suppression in 2012 if test be successful

CSCTF Latency

✓ Didn't change CSCTF Latency for the last few years

✓ Documentation should be reviewed

✓ GMT delay CSCTF by 5 BX -> we have plenty BXs to use for upgrade

✓ If it is needed we have possibility to save extra 2 BX:
- switch off Bunch Crossing Analyzer, witch try to combine
  CSCTF track from stubs in 3 bx window
- firmware should be rewritten to do it
- we will lost some efficiency due to this so we don't recommend to use such way

Emulator Status: Online DQM (run 178099)
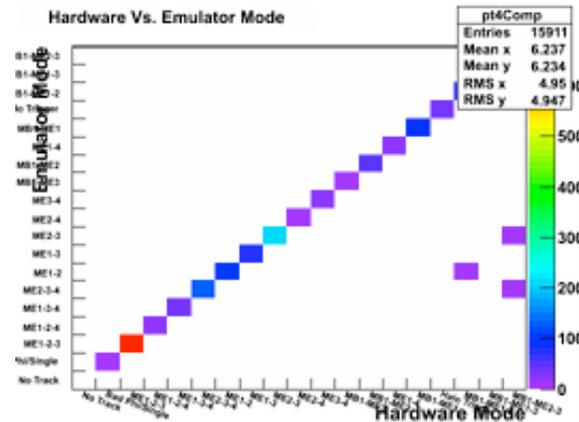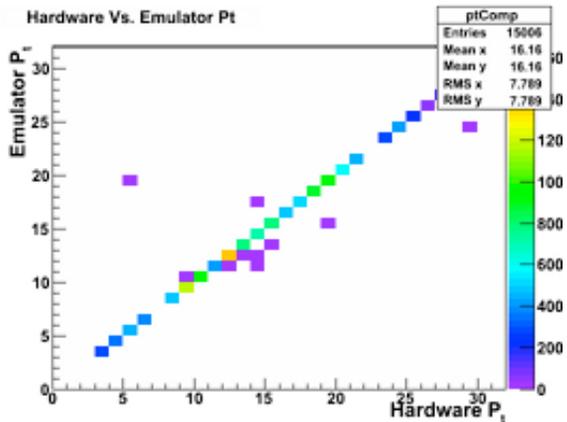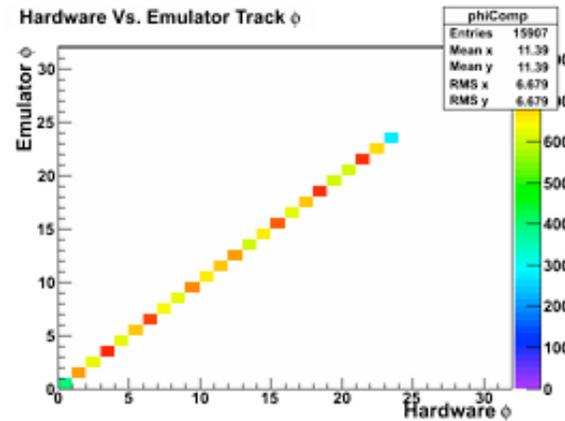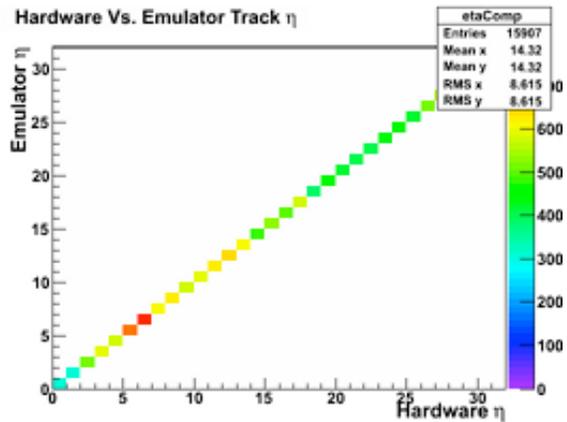
hardware<->emulator disagreement less then 0.15%
- tests in 904 have shown that the mismatch is on the output of Sector Receiver LUTs.
  Requires additional debugging.
➔ very good shape

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CSCTF Problems During 2011 Data Taking

Software:

✓ CSCTF CELL is hanged and didn't show any errors.
  The CSCTF couldn't configure then and take previous configuration.
  - it happens once per every 3-4 weeks
  - error is not reproducible at 904 test stand
  - once it was appeared during stable beam (8.10.2011) -> lost few pb^{-1}
  - it possible to debug only when this error appeared again:
      - run shouldn't be stop
      - we need 5-10 minutes to attach GDB and debug the problem after
  - The CSCTF Configuration script has been updated at P5 + CVS, 10.10.2011:
    if CSCTF fails to configure -> the run will stop and an error will be reported
    to the DAQ shifter to call the CSCTF Expert.

Other problems during data taking:

✓ CSCTF erros at DAQ Doctor during Stable beam in 2011 year:
  - only 2 times CSCTF DDU TTSError (09.10 & 02.06)
  - only 3 times CSCTF SPs TTSSync (21.08, 25.05, 23.04)

CSCTF and CSCTF DDU almost didn't cause problems during data taking 2011

Some Extra Plans for Improvements

✓ The tables we are writing now in DBS are growing too
  much and too quickly

  - We need to re-organize the tables
  - After we could retrieve and display them on WBM which is
    currently not done but for the CSCTF rates

✓ Clean up DQM plots:

  - Make it more friendly for users (log scale where necessary…)

Conclusion

✓ CSCTF has very stable hardware which didn't cause problem at Point 5
   for last few years

✓ Almost 100% agreement at Emulator

✓ Only few bugs during data taking

Plans:

✓ Planning to use new CSCTF data format with extra zero suppression
   in 2012 if test be successful during November Technical Stop

✓ Planning to review PTLUTs for 2012 data taking

CSCTF perform very well