

TGC Online Monitoring - Instructions for the muon SHIFTERs using OHP

March 2011

A minimized OHP structure

- The online data quality monitoring for the TGC, in the shifter's scope, is done at the chamber-level, with a total of 26 histograms.
- In OHP, one can choose between three histogram tabs - two per side (A and C) and another one for both the inner wheels.
- In the A/C tabs there are 12 histogram pads, one per sector.
- On every pad (sector), there are three overlaid histograms representing each a 1/3 of the possible bunch-crossings, i.e. *previous*, *current* and *next*.
- On each tab (sector), the overlaid horizontal lines represent the physical margins of the wheels (green) or layers (red) that composite the corresponding sector.
- In the third tab (inner wheels), the two sides are presented in two pads (per side).

A minimized OHP example picture

The screenshot displays the OHP Nexus - [TGCGlobalView] application window. The interface is divided into several sections:

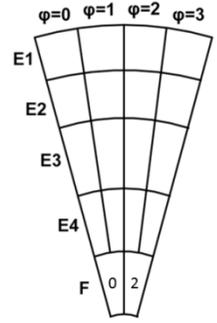
- Top Bar:** Contains the application title "OHP Nexus - [TGCGlobalView]", a menu bar with "File", "Actions", "Window", and "Help", and a toolbar with various icons.
- Left Panel (Plugins):** Lists "TGC" and "TGCGlobalView" (checked). Below this, there are buttons for "MDT", "RPC", "CSC", and "Browser".
- Main Area:** A grid of 12 plots, labeled "SECTOR 1" through "SECTOR 12". Each plot shows "H/s per Chamber in B/Current" on a logarithmic y-axis (from 10⁻² to 10⁴) against time. The plots are color-coded: (RED) Previous_BC, (GREEN) Current_BC, and (BLUE) Next_BC. Vertical dashed lines indicate the boundaries between sectors. Above the plots, tabs for "SIDE_A", "SIDE_C", and "INNER" are visible. At the bottom of the grid are "Force Update" and "Reset" buttons.
- Right Panel (OHP Panel):** Contains an "Info" section with the following data:
 - Status: RUNNING (green button)
 - Partition Name: part_TGC_of1 (green button)
 - Onl. Servers: Histogramm... (blue button)
 - Off. Servers: Histogramm... (red button)
 - Notifications Rate: [input field]
 - Notifications: [input field]A "More" button is located below the info section. Below that is a "Legacy Control Buttons" section with "Reconnect" (green button) and "Pause/Resume" (yellow button).

The Windows taskbar at the bottom shows the Start button, taskbar icons for "atlasgw.cern.ch - PuTTY", "OHP - noam.com@gmail...", "OHP Nexus - [TGCGlob...", and "ohp_A - Paint".

Histogram arrangement logic in OHP

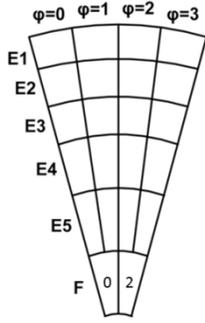
Note that there's no strip layer #2. Therefore, it is expected that this layer will in general be lower than the others

Sector (of Wheel M1)



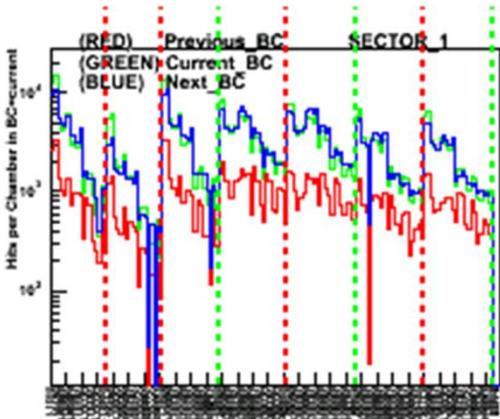
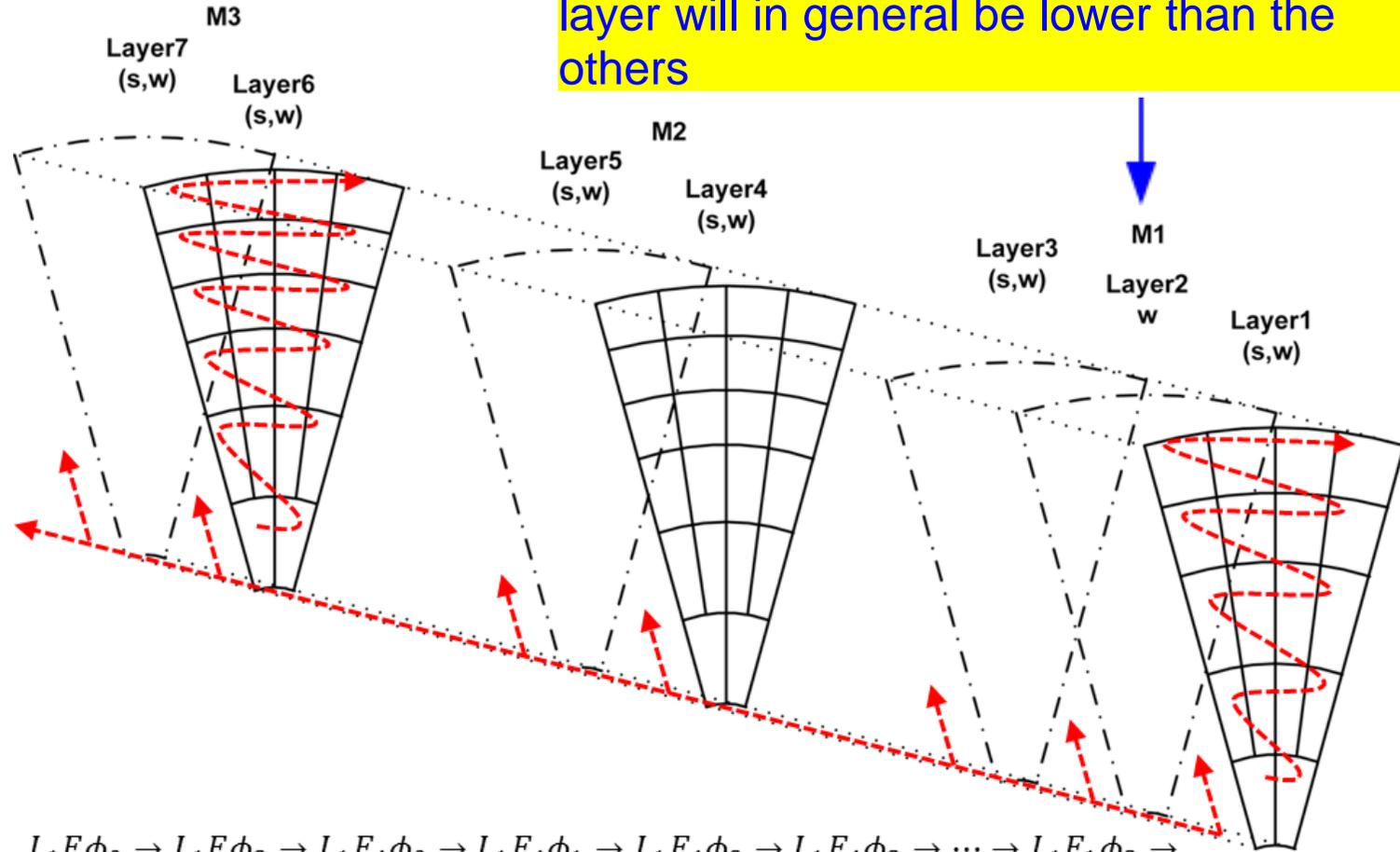
X 2 Strip Layers
X 3 Wire Layers

Sector (of Wheel M2 / M3)



X 2 Strip Layers
X 2 Wire Layers

For every layer in the profile histogram below, a peak in the first bins is expected since the first bins of the layer represent the forward chambers (closest to the beam-pipe) whereas the last bins of the layer represent the end-cap chambers

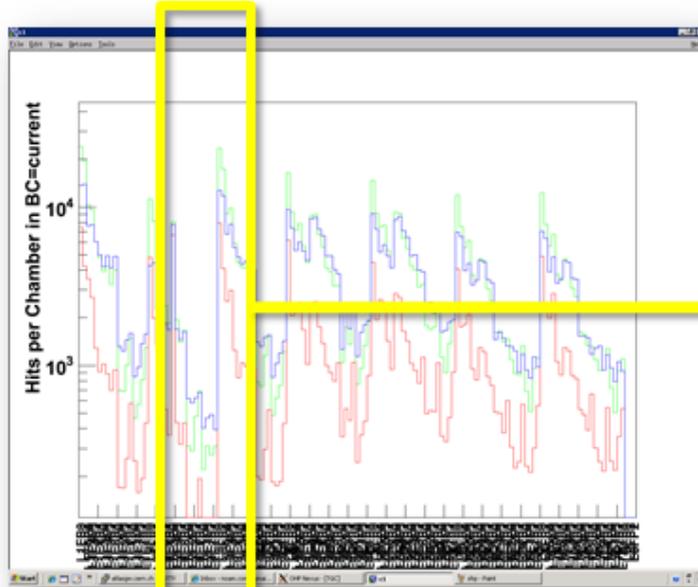


$L_1 F \phi_0 \rightarrow L_1 F \phi_2 \rightarrow L_1 E_4 \phi_0 \rightarrow L_1 E_4 \phi_1 \rightarrow L_1 E_4 \phi_2 \rightarrow L_1 E_4 \phi_3 \rightarrow \dots \rightarrow L_1 E_1 \phi_3 \rightarrow$
 $L_2 F \phi_0 \rightarrow \dots \rightarrow L_2 E_4 \phi_3 \rightarrow$
 $L_3 F \phi_0 \rightarrow \dots \rightarrow L_2 E_4 \phi_3 \rightarrow$
 $L_4 F \phi_0 \rightarrow \dots \rightarrow L_4 E_4 \phi_3 \rightarrow L_4 E_5 \phi_0 \rightarrow L_4 E_1 \phi_3$
 $L_5 F \phi_0 \rightarrow \dots \rightarrow L_5 E_1 \phi_3 \rightarrow \dots \rightarrow L_7 E_1 \phi_3$

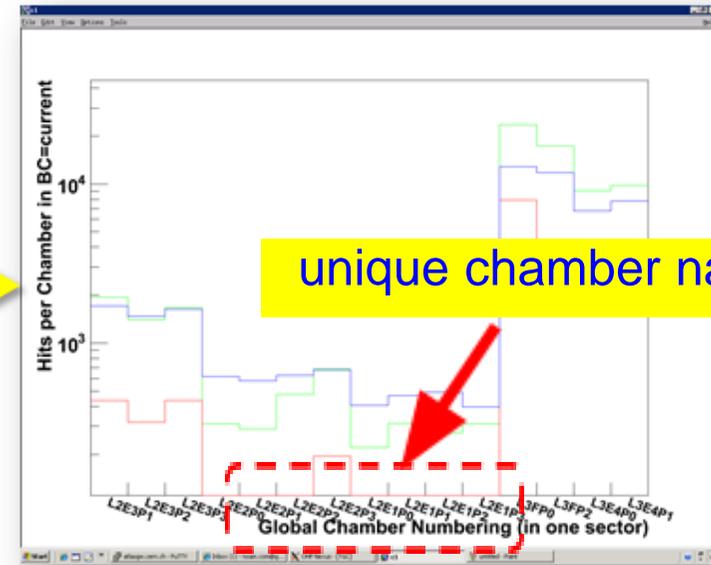
Zooming on the histograms

double click on the pad.
each pad represents a sector

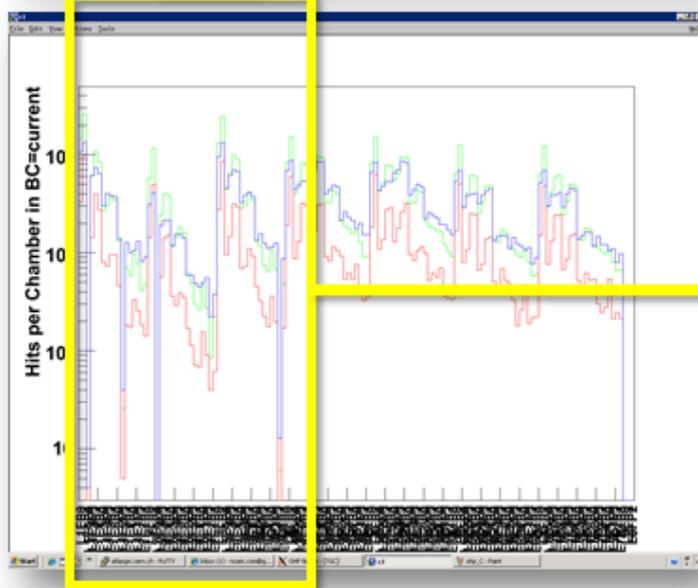
drag the marker around the range of
interest on the X-axis (as in ROOT)



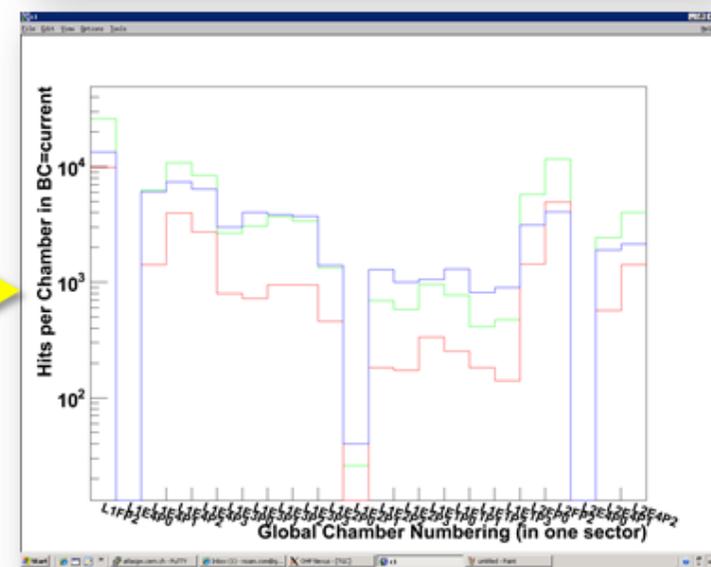
A08



unique chamber names



C12



In the zoomed histogram, see the exact chamber name in the labels that span the X-axis

Problems

Dead chambers (occupancy)

Bins (chambers) with zero entries in **all of the 3** BC histograms

Noisy chambers (occupancy)

Bins (chambers) with **extremely higher** number of entries than the overall-level of the histogram

Bad timing

The *current* BC histogram (green) is **much lower** than the other two (*previous & next*)

If I see "dead chambers" what should I do ?

- "Dead chambers": 0 entries in 3/3 overlaid histograms
- For about ~1-10 sequential and/or sparsely-spread "dead chambers", take the names from the X-axis and document these in the e-log by the end of the shift.
- For more than $>\sim 10$ sequential "dead chambers", notify the shift leader immediately and call the TGC on-call expert.

If I see "noisy chambers" what should I do ?

- "Noisy chambers": $N_{\text{hot-bin}}/N_{\text{overall-level}} >\sim 10^3$
- For about ~1-10 sequential and/or sparsely-spread "noisy chambers", take the names from the X-axis and document these in the e-log by the end of the shift.
- For more than ~ 10 sequential "noisy chambers", notify the shift leader immediately and call the TGC on-call expert.

If I see "bad timing" what should I do ?

- Chambers with "bad timing": in a certain bin (chamber), the green histogram is much lower than than the red and/or the blue histogram, approximately like: $N_{\text{red or blue}}/N_{\text{green}} > \sim 10^3$
- For about ~1-10 sequential and/or sparsely-spread "bad timing" chambers, take the names from the X-axis and document these in the e-log by the end of the shift.
- For more than $> \sim 10$ sequential "bad timing" chambers, notify the shift leader immediately and call the TGC on-call expert.

A note on the "bad timing" issue:

We are looking here on hit-readout logic timing and NOT on the trigger-readout logic. The later should be very good whereas the former may not, i.e. in a certain bin, the entries for *previous* and *next* will be $\sim < 1\%$ of the *current* for triggers while for hits they can be of the same order or even higher than the *current*.

The reason for that is due to the fact that a "trigger" is made by taking coincidence among chambers (5/7 wires and 4/6 strips) and the most of the triggers can be expected to be within the 25[ns] of the *current* BC while an unassociated "hit" may be found outside the current BC time window. **Therefore, the behavior of the hit-readout logic wont' be perfect but it is expected that the current (green) histogram will be mostly on top of the other two (red or blue).**