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L4 Histograms – Forward Proton Spectrometer

When to Check them

It makes sense to check the L4 histograms

- if there are ramped protons in the machine, and
- if "normal" triggers are running (phase 2, 3, or 4).

Which Histograms Do Exist?

There are fourteen L4 histograms for the forward proton spectrometer (numbers 19403 up to 19416). Not all of them are included into the normal L4 histogram check list for the shift crew. You find them on the L4 histogram Mac under the view "FPS: PSPM maps", "FPS: MCPM maps", "FPS: tile maps", and "FPS: Readout".

View "FPS: PSPM maps" (19408)

The histogram shows a map of the ADC counts for the pixels of the position sensitive photomultipliers (PSPM). Four PSPMs, each with 64 pixels, belong to one Roman pot station. The left four quadrants represent the 81V PSPMs, the right ones the 90V PSPMs.

Check for new holes, which would mean there are new "dead" pixels, and for enlarged boxes, which would probably be a noisy channel. If so, please, make a note in the FPS logbook (it's in front of the FPS PC, room 307).

View "FPS: MCPM maps"

The histogram shows a map of the ADC counts for the pixels of the microchannel plate photomultipliers (MCPM). Four MCPMs, each with 128 arranged in the inner part of a matrix of 144 pixels, belong to one Roman pot station. The left four quadrants (19412) represent the MCPMs of the 64H station, the right ones (19413) correspond to the 80H station.

Check for new holes, which would mean there are new "dead" pixels, and for enlarged boxes, which would probably be a noisy channel. If so, please, make a note in the FPS logbook (it's in front of the FPS PC, room 307).

View "FPS: tile maps"

Make sure that the number of events for the current run is at least greater than 15,000.

Left Hand Side In these figures the ADC counts of the trigger scintillator tiles are shown. The y-axis represents the tile number, the x-axis the plane. Each plane consists of four tiles, the first four planes belonging to the 81V station, the last four ones to the 90V station. The upper diagram, 19404, displays the digital information from the trigger tiles, the lower diagram (19407) the analog values.

Check for holes and enlarged boxes. The first could be due to a dead or simply switched off channel, the latter may be due to a noisy channel. If so, please, make a note in the FPS logbook (it's in front of the FPS PC, room 307).

Left Hand Side Here, both analog and digital information are combined in one picture, 19415. It treats the horizontal stations, 64H and 80H. For the moment, check only that there are entries at all.

If the L4 histograms are empty or only entries for one of the pots are present, first check the HV for the FPS. It can be seen on the HV sense panel in room 301, or at the LED above the FPS PC in room 307, rack B19. Both should be green. If they are o.k., check also each channel on the FALCO terminal in room 101, rack O2. A description on how to handle the FALCO terminal for the FPS can be found in the Shift Crew Instructions folder, section 18, and also in room 101 next to the FALCO. Maybe channels have been switched off due to a trip. Switch them on again, if so. Otherwise, if all looks ok, however the L4 histograms don't, call the FPS expert on call.

View "FPS: readout"

Histogram "FPS: Channels in JDPC Bank" (19410) This histogram shows the length of the bank JDPC, which contains the compressed data from the fiber hodoscope, for every event.

Check if the length is not zero for all events, running at least in trigger phase 2, or if the histogram is empty at all. In case it is, check that the FPS is in the H1 readout. The FPS system belongs to the branch 10, subsystems 101. Check also the that branch 10 is running in a proper state (should affect also the luminosity and forward muon readout). If the FPS is in the readout, the HV on for the FPS (see above), check the FPS data acquisition Macintosh in room 307. A short guide exists on how to handle FPS DAQ problems, see the shift crew instructions folder or look in front of the FPS data acquisition Macintosh.

If the FPS is in readout and you have checked that the MAC is in a proper state, however the bank lengths are still zero, please call the FPS expert on call.

If the distribution peaks at the rightmost side of the histogram, then possibly the pedestals that usually are subtracted by the FIC have been lost. This can be verified by switching on the Event Display on the FPS MAC, menue 'Expert', item 'Windows', item 'Event Display'. (It's a toggle switch.) You will get another window which shows a schematic view of the FPS with the information which fibres and tiles have been hit. In case of lost pedestals, all fibres will be highlighted. If so, reload the FIC: menue 'Shift', item 'Load FIC'.

Histogram "FPS: Channels in JDTC Bank" (19409) Similarly to the histogram 19410, this represents the length of the JDTC bank which contains the trigger scintillator data. Check this histogram in the same manner as the histogram for the JDPC bank lengths.