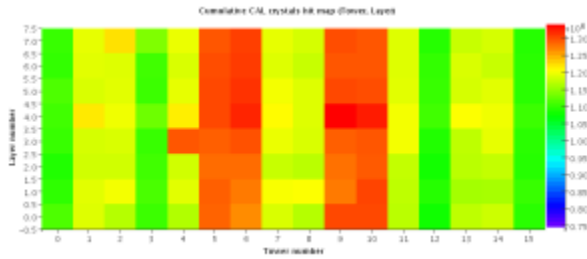


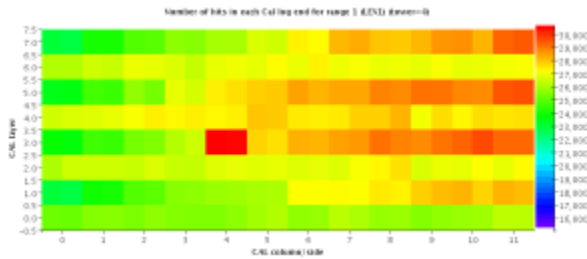
High occupancy in noisy CAL channel

It was noticed that the monitoring plots show high occupancy in CAL channel tower=4, layer=3, column=3, face=0.

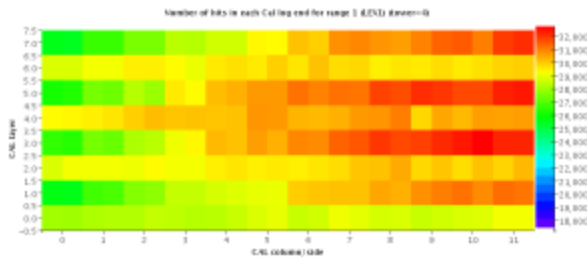
It is visible in January 2009 in CAL hits map for tower/layer:



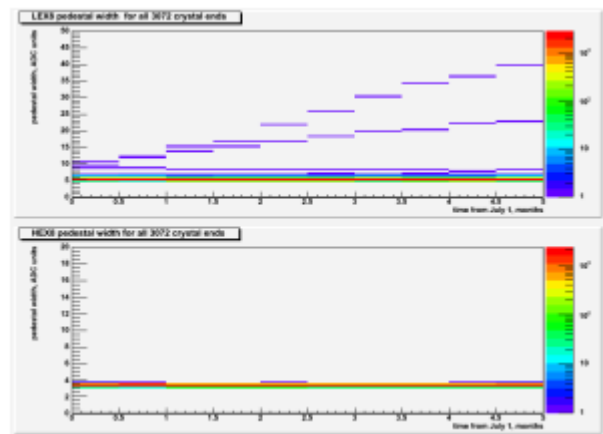
as well as in hits map for tower 4:



while in September 2008 it wasn't there:



This extra occupancy in one crystal is caused by increasing pedestal noise in LEX8 range of this crystal end. The fact that the noise in this channel is "out of family" was noticed yet during the ground test, but at that time it was not big enough to visibly affect the occupancy. But the noisy in this channel was increasing on orbit - see pedestal width trending plot for all channels over 5 month:



The channel with biggest pedestals noise ~40 LEX8 units (1.3 MeV) in November 2008 on the top 2d histogram is tower=4, layer=3, column=3, face=0; the second "out of family" channel is tower = 6, layer=4, col=1, face=0, pedestal noise~23 LEX8 ADC units (0.8 MeV). The average pedestal noise in LEX8 range is 5 ADC units (0.17 MeV).

The proposed solution for the problem was to increase the LAC threshold for the noisy channel upto maximum value (LAC DAC=127) and thus exclude it from the decision on data readout from this crystal, which will be controlled only by the opposite side of this crystal, having normal pedestal noise. The modified LAC configuration has been generated and will be uploaded to LAT this week.

This level of noise ~ 1.3 MeV in one channel doesn't affect LAT energy resolution, which is ~ 15 MeV for 100 MeV photon, so we don't have to mask this channel from the energy reconstruction.

It is also small compared to FLE trigger threshold (100 MeV per crystal), so no masking of FLE signal is required.

We should follow the evolution of the noise in CAL channels to take appropriate actions when necessary.