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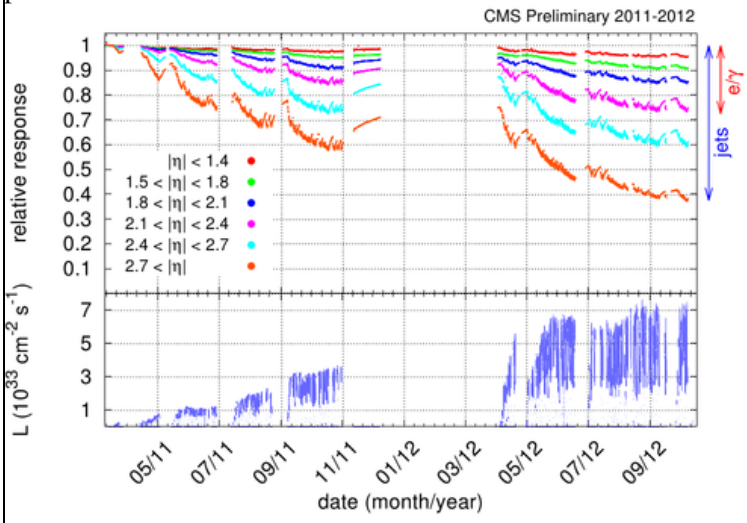
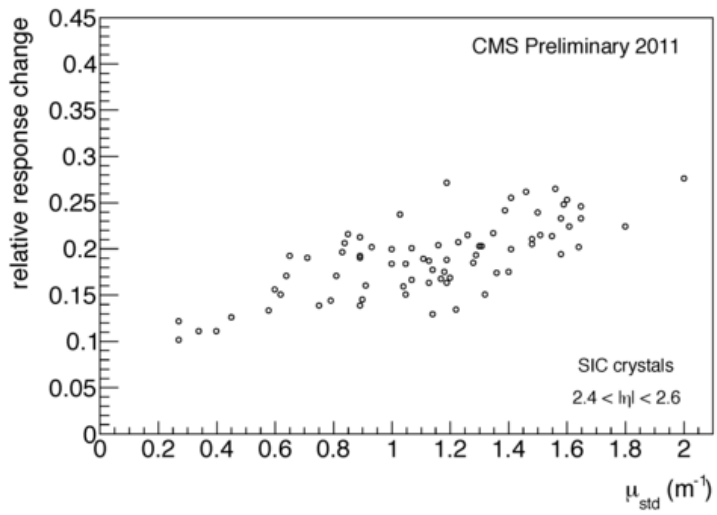
CMS-DP-2012/027
ECAL response variations due to LHC irradiation

Abstract: Plots of the ECAL response to laser monitoring light in CMS during 2011 and 2012. The dependence vs time, eta and crystal radiation hardness are shown

CDS entry

iCMS entry

Figure	Caption
pdf version 	***Relative response to laser light (440 nm) measured by the ECAL laser monitoring system, averaged over all crystals in bins of pseudorapidity, for the 2011 and 2012 data taking periods*** The response change observed in the ECAL channels is of the order of a few percent in the barrel, while it reaches up to 25% in the most forward endcap regions used for electron and photon reconstruction. The response change is up to 60% in channels closest to the beam pipe. These measurements are used to correct the physics data. This is an update of the plots appearing in CMS-DP-2012/007 and CMS-DP-2012/015, and includes measurements taken up to October 2012. The bottom plot shows the instantaneous LHC luminosity delivered during this time period. **Out of date: this plot has been superceded by this plot**
pdf version	***Correlation between relative change of response from ECAL monitoring data, and the absorption coefficient, μstd, induced in crystals by a standard irradiation*** The relative change of response is computed between 6-–September-–2011 and 4-–October 2011. The parameter μstd is measured from a standard irradiation, performed during crystal quality control measurements, prior to their installation in CMS. Crystals produced by Shanghai Institute of Ceramics (SIC), and installed in CMS in the eta range 2.4 < < 2.6, are plotted.



The presence of a correlation proves that a fraction of the signal loss is due to a change in crystal transmission from ionizing radiation damage.

The positive intercept of the correlation hints at the presence of a fraction of signal loss, uncorrelated with μstd, which could be caused by other sources, like losses in VPT response or cumulative losses from hadron specific changes in crystal transmission.

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