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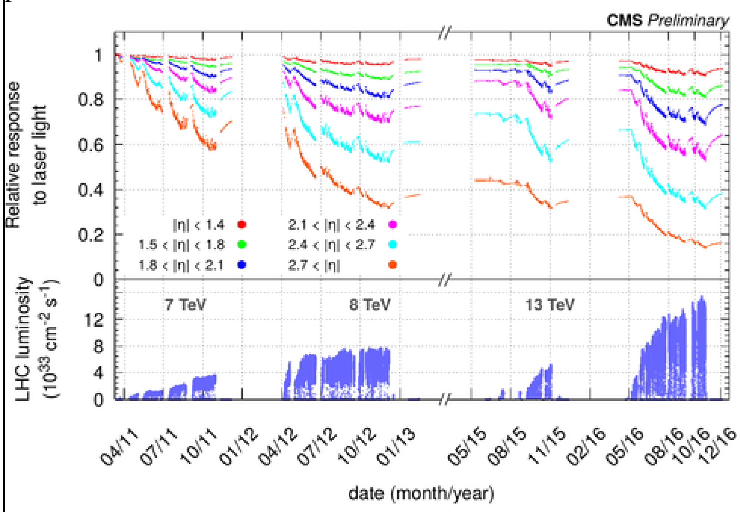
CMS-DP-2017/003

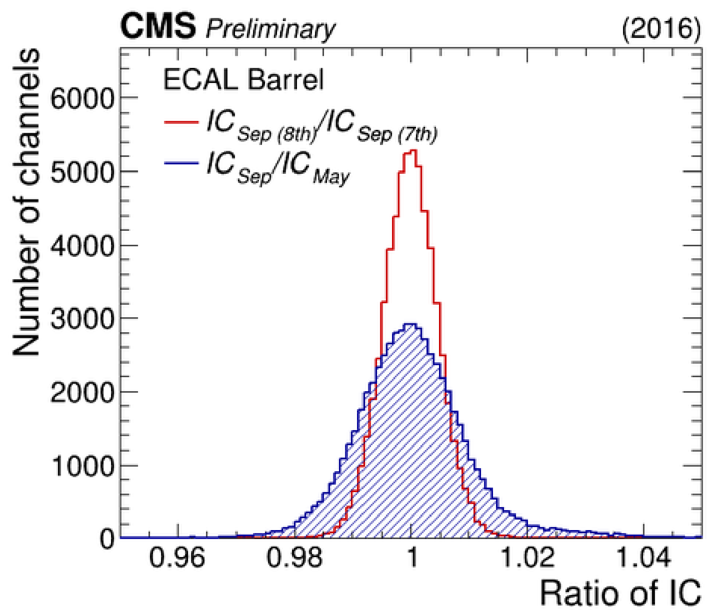
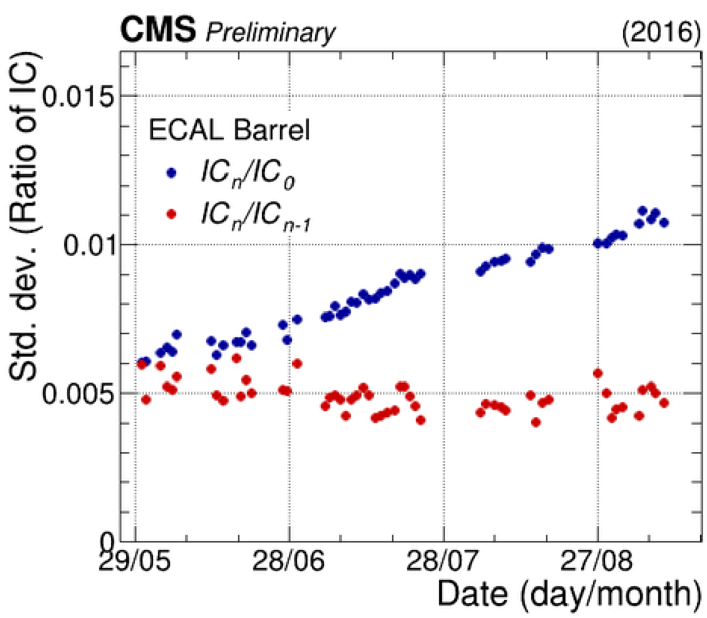
ECAL Laser monitoring till end of 2016 and ECAL phi-symmetry

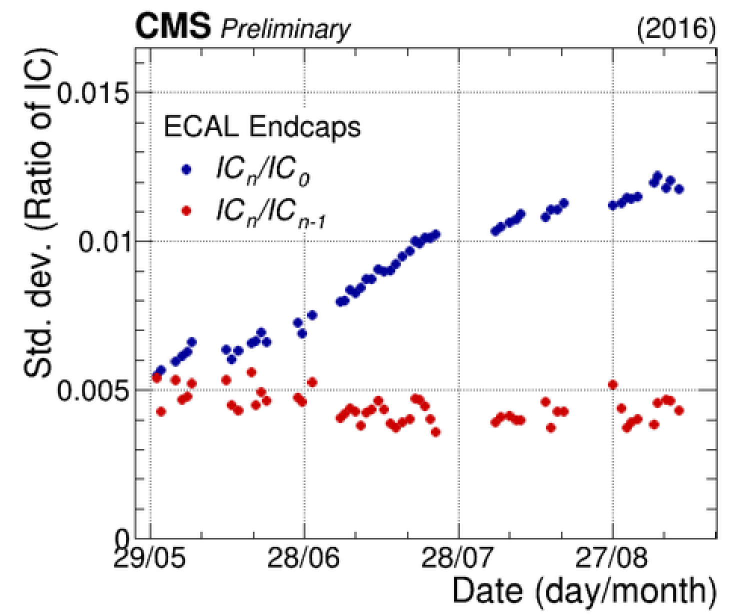
Abstract: ECAL Laser monitoring till end of 2016 and ECAL phi-symmetry.

CDS entry

iCMS entry

Figure	Caption
pdf version 	Relative response to laser light (440 nm in 2011 and 447 nm from 2012 onwards) injected in the ECAL crystals, measured by the ECAL laser monitoring system, averaged over all crystals in bins of pseudorapidity, for the 2011, 2012, 2015 and 2016 data taking periods, with magnetic field at 3.8 T. The response change observed in the ECAL channels is up to 10% in the barrel and it reaches up to 50% at ~ 2.5, the limit of the tracker acceptance. The response change is up to 90% in the region closest to the beam pipe. The recovery of the crystal response during the Long-Shutdown-1 period is visible, where the response was not fully recovered, particularly in the region 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, CMS-DP-2012/015, CMS-DP-2015/016, CMS-DP-2015/063, and CMS-DP-2016/031 and includes measurements taken up to November 2016. The bottom plot shows the instantaneous LHC luminosity delivered during this time period.

pdf version 	Distribution of the ratio of the intercalibration coefficients (IC) for all the channels in the CMS ECAL barrel (< 1.5). The IC are derived exploiting the azimuthal symmetry of zero bias events: each IC set is derived with more than 80 million events collected over no more than two days which gives a statistical precision of about 0.4% on the IC ratio. The blue histogram is the ratio (IC Sep /IC May) between the last time period used for the monitoring during 2016 and the first one, while the red histogram (IC Sep (8th) /IC Sep (7th)) is the ratio between the values derived in the last period (8 th of September) and the one derived in the period immediately before (7 th of September). The first and last periods are separated by four months while the typical time period between two successive calibration points is less than 48 hours. The plot shows that the channel intercalibration coefficients vary significantly over a period of several months. For a review of the f-symmetry method see: Energy calibration and resolution of the CMS electromagnetic calorimeter in pp collisions at √s = 7 TeV , J. Instrum. 8 (2013) P09009
pdf version 	The plots show the relative variation of the intercalibration coefficients (IC) of the CMS ECAL during 2016 data taking. The IC are derived such that for channels located at the same pseudorapidity the average is one, while the intercalibration of different regions is then set using Z e + e - events. The monitoring is performed exploiting the azimuthal symmetry of zero bias events: each IC set is derived with more than 80 million events collected over no more that two days, which provide a statistical precision of about 0.4% on the ratio of IC. The left plot includes channels in the barrel (< 1.5) while the right one in the endcaps (> 1.5).

	For each channel and for each point in time two ratios are computed: IC n /IC n-1 and IC n /IC 0 being n, n-1 and 0 the current, previous and first point of the year. The standard deviation of the two ratios is computed at each time period and is plotted versus time: blue points (IC n /IC 0 , relative to the start of 2016); red points (IC n /IC n-1 , relative to the previous calibration point). The width of the ratio of IC relative to the start of 2016 increases with time, whereas it remains constant for close time periods. For a review of the f-symmetry method see: Energy calibration and resolution of the CMS electromagnetic calorimeter in pp collisions at √s = 7 TeV , J. Instrum. 8 (2013) P09009
pdf version  	The plots show the relative variation of the intercalibration coefficients (IC) of the CMS ECAL during 2016 data taking. The IC are derived such that for channels located at the same pseudorapidity the average is one, while the intercalibration of different regions is then set using Z e + e - events. The monitoring is performed exploiting the azimuthal symmetry of zero bias events: each IC set is derived with more than 80 million events collected over no more that two days, which provide a statistical precision of about 0.4% on the ratio of IC. The left plot includes channels in the barrel (< 1.5) while the right one in the endcaps (> 1.5). For each channel and for each point in time two ratios are computed: IC n /IC n-1 and IC n /IC 0 being n, n-1 and 0 the current, previous and first point of the year. The standard deviation of the two ratios is computed at each time period and is plotted versus time: blue points (IC n /IC 0 , relative to the start of 2016); red points (IC n /IC n-1 , relative to the previous calibration point).

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-- AndreaMassironi - 2017-02-17

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