

Table of Contents

CMS-DP-2012/026 ECAL Barrel HV performance plots.....	1
---	---

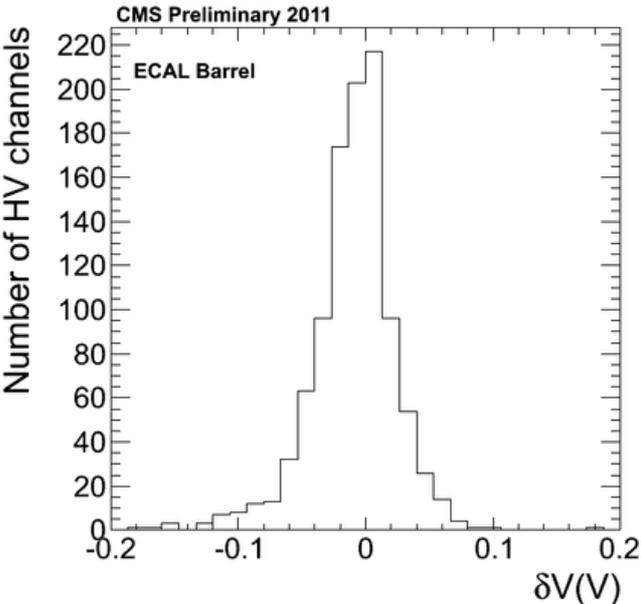
CMS-DP-2012/026

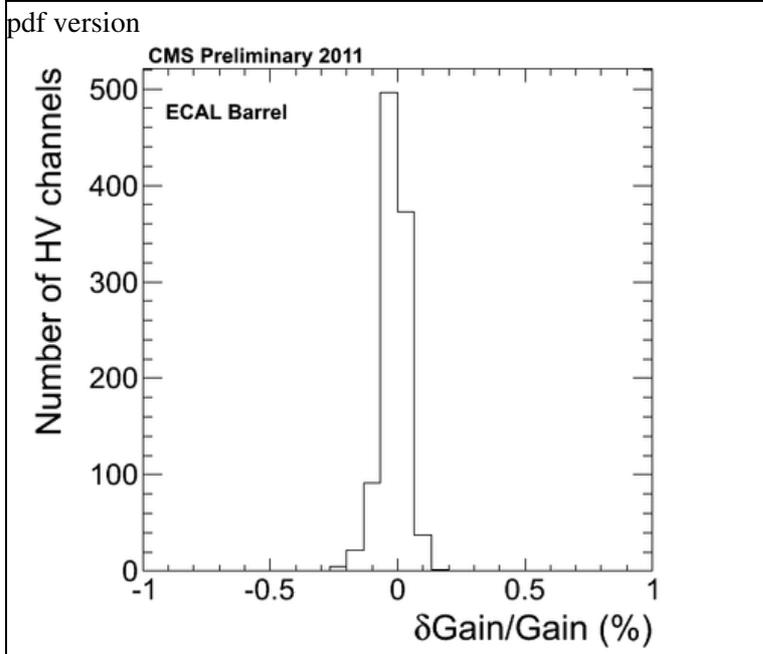
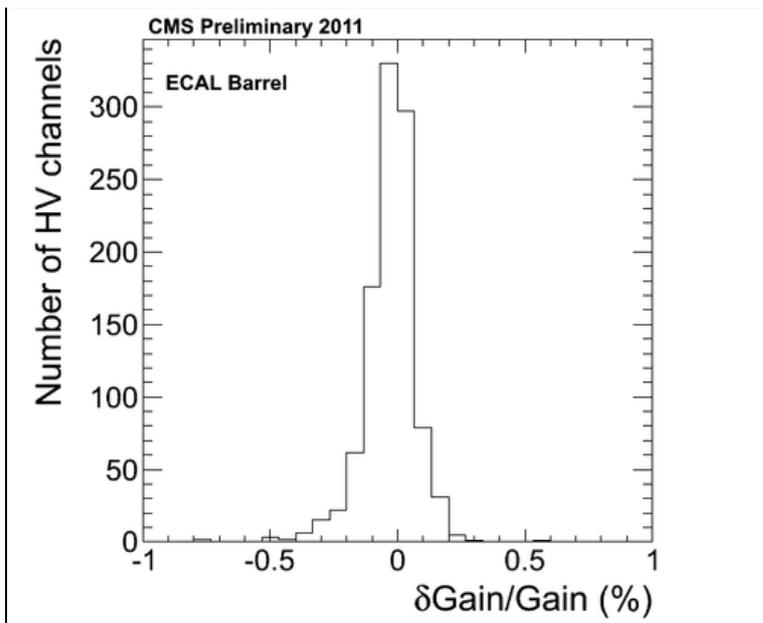
ECAL Barrel HV performance plots

Abstract: Performance plots on channel stability of the ECAL Barrel High Voltage and APD gain stability system during the 2011 operations. Dark current time evolution at different pseudo-rapidity and average dark current vs pseudo-rapidity are also shown.

CDS entry [↗](#)

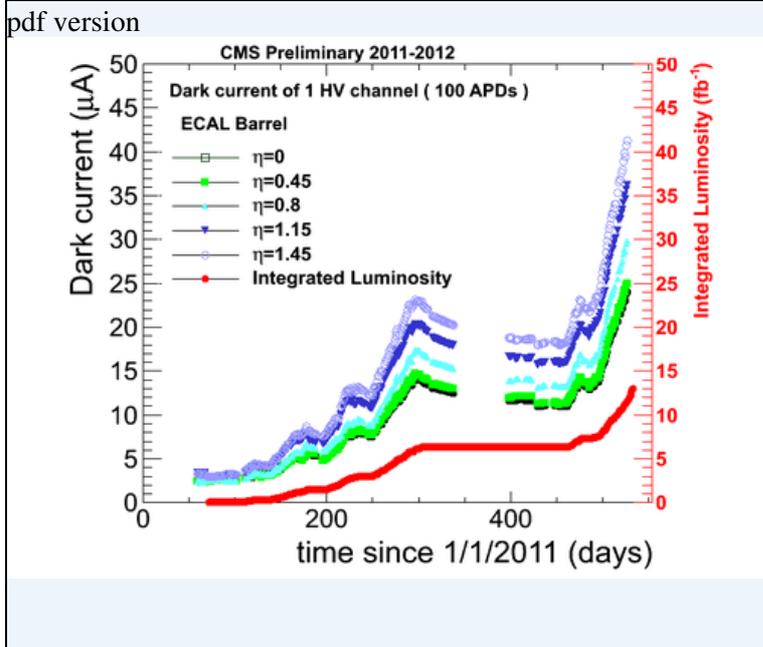
iCMS entry [↗](#)

Figure	Caption
<p>pdf version</p> 	<p><i>Channel stability of the ECAL Barrel High Voltage system during the 2011 operations</i></p> <p>Each channel of the ECAL Barrel High Voltage system gives bias to 50 pairs of APDs. There are 1224 channels. The APDs are operated at a gain of 50. The voltage required to have a gain of 50 is typically between 380-400 V. The APD gain depends on the bias voltage at 3%/Volt. The HV system is calibrated once or twice a year with dedicated electronics. During this calibration the voltage is set at 380 V and the voltage output is measured. If a deviation larger than 20 mV is found, then a recalibration of the channel takes place. The calibration accuracy is 10 mV. One calibration took place at the end of 2010, and one in January 2012. The plot shows the deviation from 380V for all HV channels measured in the 2012 calibration. This represents the stability in the HV during the 2011 operation.</p>
<p>pdf version</p>	<p><i>APD gain stability due to HV system during the 2011 operations</i></p> <p>The APD gain depends on the bias voltage at $\text{Gain}/\text{Gain} = \frac{\Delta V}{V} = 3\%/\text{Volt}$ (at Gain 50)</p> <p>The plot shows the gain deviation for all HV channels measured in the 2012 calibration. These gain instabilities due to the APD HV are at the 0.1% level and they are partially corrected via the laser system.</p>



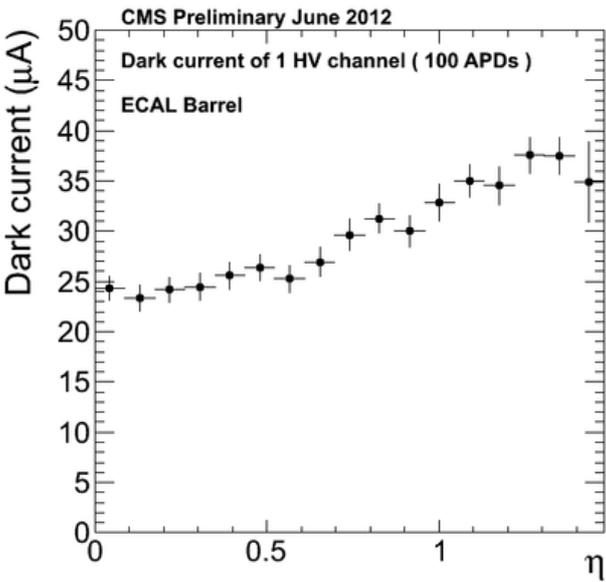
APD gain stability after laser corrections

The ECAL laser signal corrects the APD gain change as if they were crystal scintillation light instabilities
The plot shows the gain deviation after laser correction due to the HV system for all HV channels measured in the 2012 calibration. This represents the ECAL instability due to the HV system during the 2011 operation.



Dark current time evolution at different pseudo-rapidity

The APD dark current increases with neutron fluence.
The HV system measures for each channel the dark current drawn by the 50 pairs of APDs that it controls.
The plot shows the dark current evolution in time during the 2011 and 2012 runs. (Day zero is the 1/1/ 2011).
The different blue/green colors represent the different channels in one ECAL Super-Module. The neutron dose depends on eta, so the channels have different value of the current increase. The red points show the corresponding integrated luminosity.
During the winter shutdown between the

	<p>2011 and 2012 a spontaneous recovery of the dark current took place.</p>																																		
<p>pdf version</p>  <table border="1"> <caption>Approximate data points from the plot</caption> <thead> <tr> <th>η</th> <th>Dark current (μA)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>24</td></tr> <tr><td>0.1</td><td>23</td></tr> <tr><td>0.2</td><td>24</td></tr> <tr><td>0.3</td><td>24</td></tr> <tr><td>0.4</td><td>25</td></tr> <tr><td>0.5</td><td>26</td></tr> <tr><td>0.6</td><td>25</td></tr> <tr><td>0.7</td><td>27</td></tr> <tr><td>0.8</td><td>30</td></tr> <tr><td>0.9</td><td>31</td></tr> <tr><td>1.0</td><td>30</td></tr> <tr><td>1.1</td><td>33</td></tr> <tr><td>1.2</td><td>35</td></tr> <tr><td>1.3</td><td>34</td></tr> <tr><td>1.4</td><td>38</td></tr> <tr><td>1.5</td><td>37</td></tr> </tbody> </table>	η	Dark current (μA)	0.0	24	0.1	23	0.2	24	0.3	24	0.4	25	0.5	26	0.6	25	0.7	27	0.8	30	0.9	31	1.0	30	1.1	33	1.2	35	1.3	34	1.4	38	1.5	37	<p><i>Average dark current vs pseudo-rapidity (status in June 2012)</i></p> <p>The APD dark current increases with neutron fluence.</p> <p>The HV system measures for each channel the dark current drawn by the 50 pairs of APDs that it controls.</p> <p>The plot shows the average dark current for each HV channel versus eta measured in June 2012, when the delivered integrated luminosity was 13 fb⁻¹.</p> <p>The neutron dose depends on eta, so the channels have different value of the current increase versus eta.</p>
η	Dark current (μA)																																		
0.0	24																																		
0.1	23																																		
0.2	24																																		
0.3	24																																		
0.4	25																																		
0.5	26																																		
0.6	25																																		
0.7	27																																		
0.8	30																																		
0.9	31																																		
1.0	30																																		
1.1	33																																		
1.2	35																																		
1.3	34																																		
1.4	38																																		
1.5	37																																		

This topic: CMSPublic > EcalDPGResultsCMSDP2012026

Topic revision: r1 - 2013-07-11 - ToyokoOrimoto



Copyright &© 2008-2022 by the contributing authors. All material on this collaboration platform is the property of the contributing authors.

or Ideas, requests, problems regarding TWiki? use Discourse or Send feedback