

**Monitorização  
e controlo em linha  
da qualidade  
dos cristais e hardware  
do calorímetro electromagnético  
de CMS**

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Encontro do Grupo Portugal/CMS  
*Lisboa, 16-Nov-2000*

# Calorímetro electromagnético

▷ **Barrel**

▷ **Endcap**

- Muito extenso em  $\eta$   $\Rightarrow$  cristais com geometria projectiva

- Barrel subdividido em 36 SuperMódulos de  $85 \times 20 = 1700$  cristais

- Testes em 2000 no feixe de  $e/\pi/\mu$  H4 (SPS, Hall Norte):

- Diferentes protótipos de cristais (Russos e Chineses)

- Nova electrónica de Front-End também testada (Ex: Sampling ADC de 12 bits)

$\Rightarrow$  2 matrizes de  $5 \times 6$  cristais testadas:

- cristais russos

- cristais chineses

# Monitorização escrita em JAVA

- Código "simples", seguro e portátil
- Abundantes classes para desenvolver aplicações com interfaces gráficas
- Package de histogramação versátil disponível (**JAS**, de SLAC, embora em desenvolvimento)

## Descrição sumária

- Visualização do perfil do feixe (x,y) nas câmaras de deriva (triggadas pelos *Fingers*, hodoscópios de cintilação)
- Menu de escolha do tipo de eventos a visualizar: beam, pedestal, laser, test pulse
- Afixação permanente dos conteúdos das ADCs em matrizes de  $3 \times 3$  centradas no cristal atingido pelo feixe
- Tabela global de médias e desvios-padrão das informações das ADCs
- Possibilidade de visualização de outra matriz  $3 \times 3$ , centrada num cristal à escolha, para qualquer tipo de run
- Visualização permanente das informações das Sampling ADCs:
  - ▷ evento por evento
  - ▷ perfis, i.e., soma no run, por canal de amostragem, normalizado ao número de eventos

## Futuro

- Monitorização de aspectos do *slow-control* (temperaturas, ...)
- Inclusão de alarmes

Run Selection

Run Number :

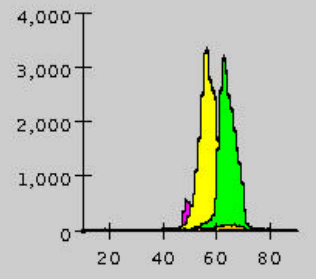
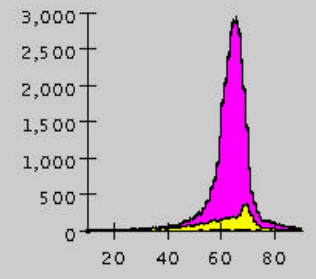
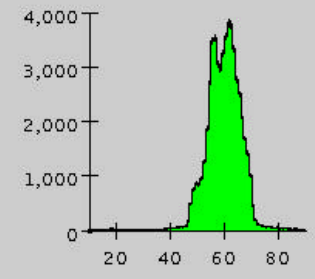
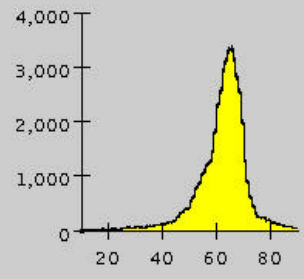
with PedFile :

Monitoring

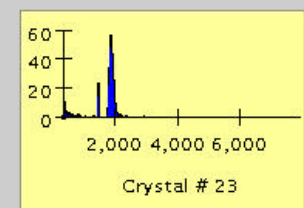
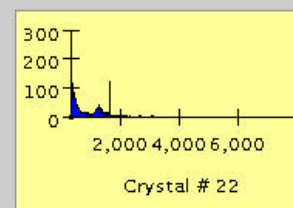
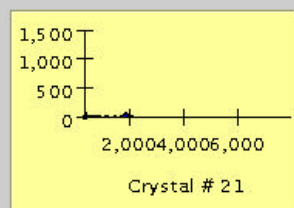
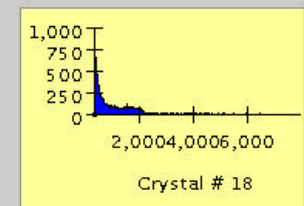
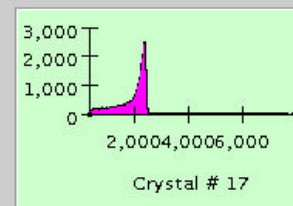
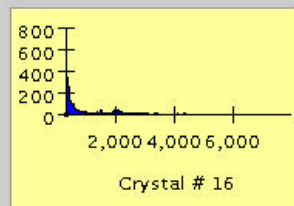
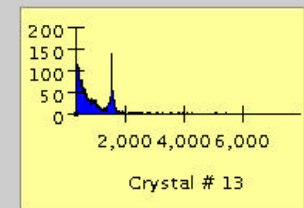
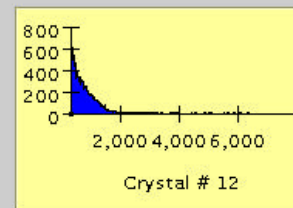
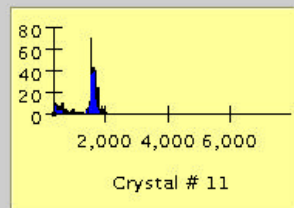
Running...

Beam

Monitoring II



	1	2	3	4	5
1	45.299	73.152	84.789	37.317	-9.8...
	133.41	137.61	149.47	107.33	135.93
2	98.802	8007...	8217...	38.9	106.59
	142.72	3570...	3523...	160.49	156.23
3	68.874	280.38	92.401	40.76	56.974
	146.24	353.23	202.56	143.12	149.04
4	226.58	1903.4	303.76	64.11	-19...
	224.86	707.62	393.59	153.39	138.06
5	245.56	107.23	76.24	28.364	-192...
	173.26	161.27	165.61	136.4	122.39
6	100.58	43.463	58.023	53.698	287.43
	138.37	130.65	154.82	150.94	181.56



Run Selection

Run Number : 36336

with PedFile : 36957

Monitoring

Start Running...

Cancel Beam

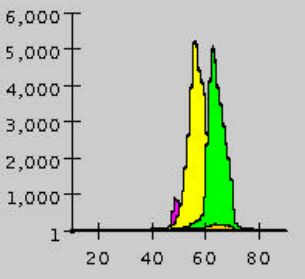
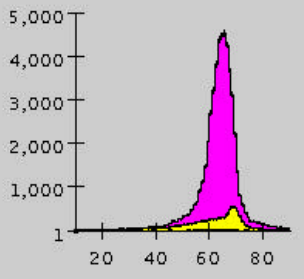
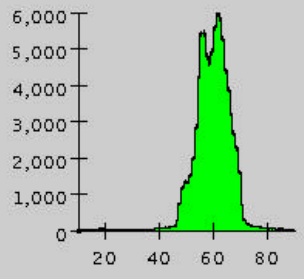
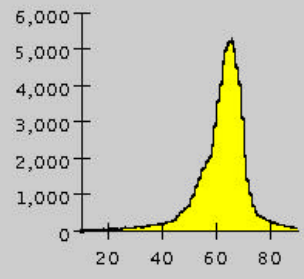
Monitoring II

Sampling ADC

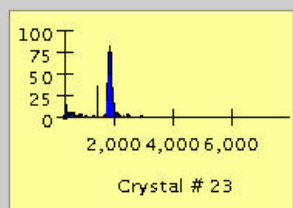
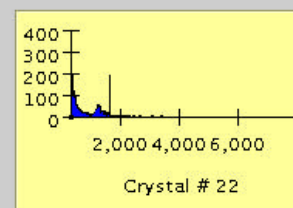
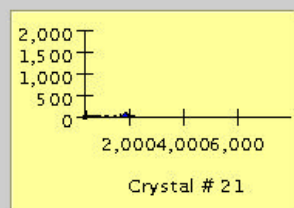
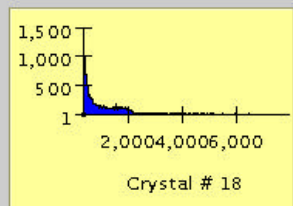
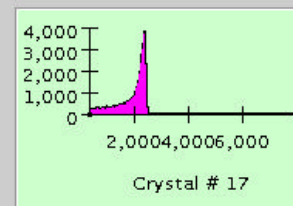
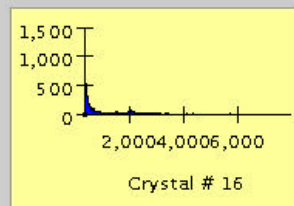
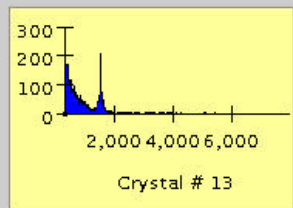
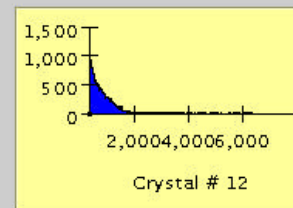
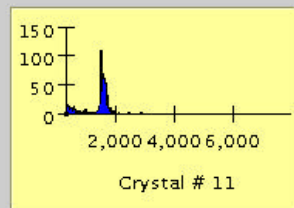
SUM Sampling ADC

Reset all histos

Rebin histos

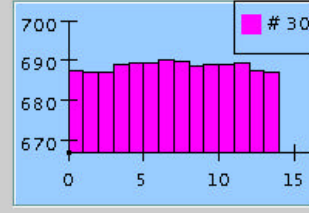
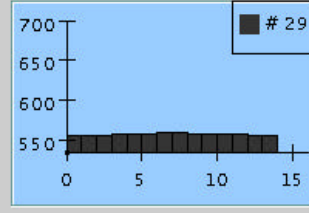
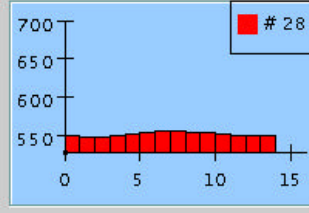
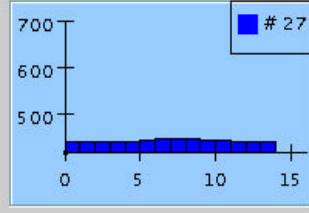
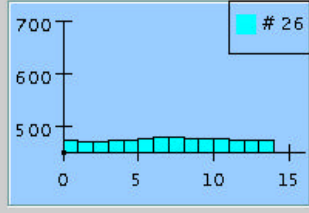
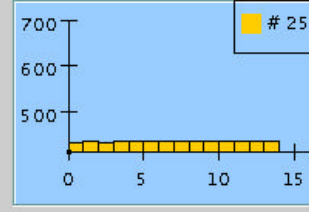
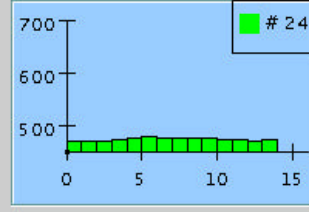
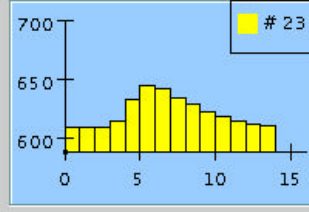
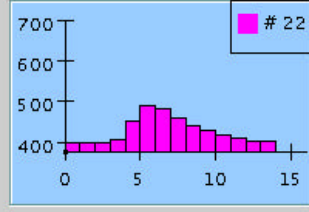
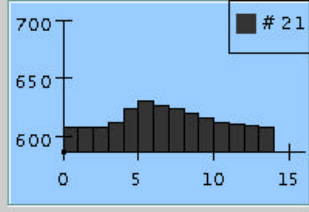
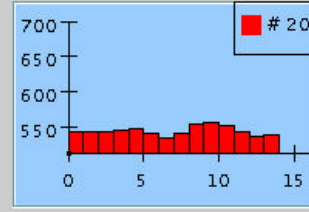
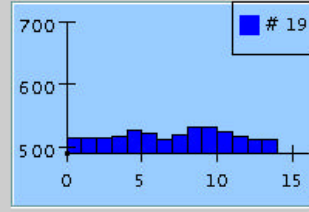
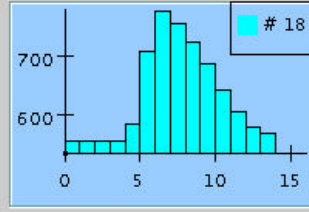
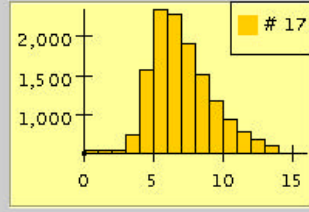
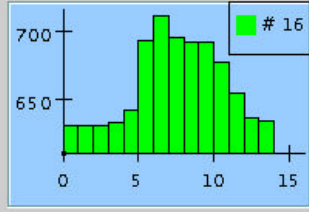
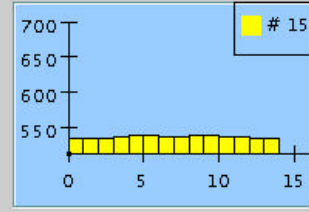
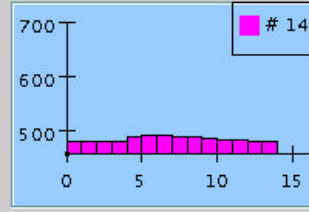
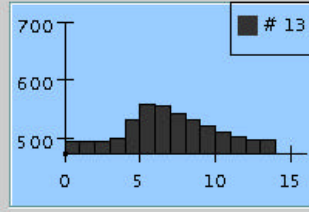
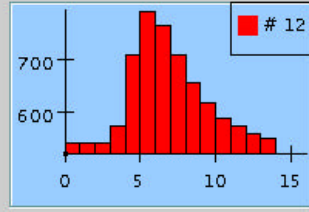
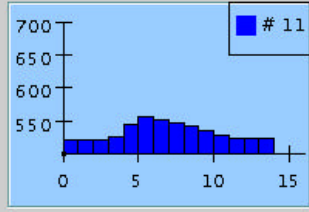
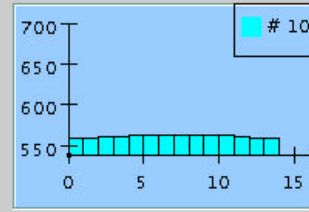
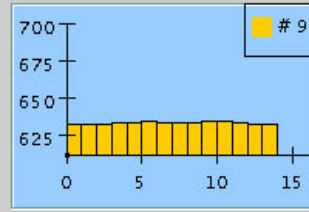
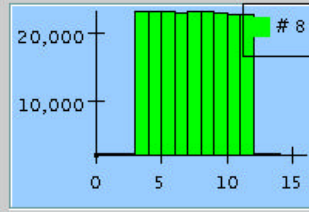
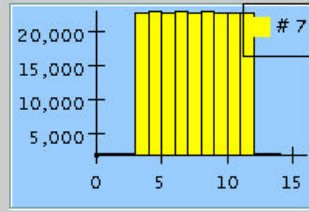
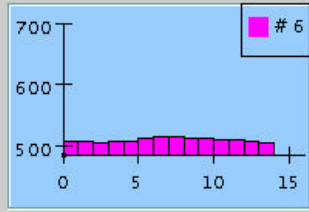
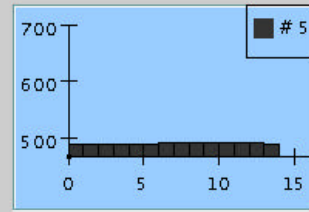
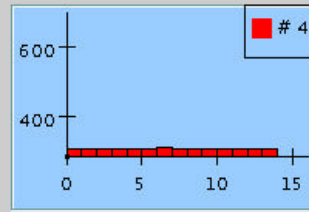
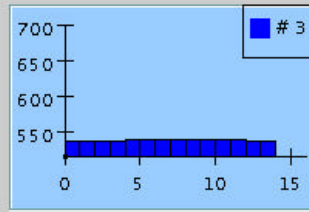
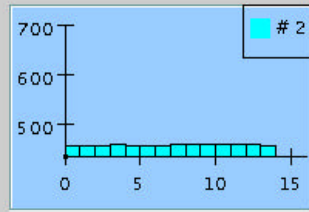
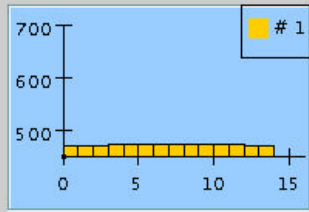


	1	2	3	4	5
1	45.537	70.974	84.259	37.366	-11...
	135.43	134.22	147.71	109.71	135.34
2	98.36	8023...	8232...	39.784	106.25
	141.99	3569...	3517...	166.42	156.35
3	69.366	281.45	92.188	41.417	57.543
	150.05	356.25	199.85	147.53	153.03
4	226.92	1904.2	301.98	63.888	-18...
	228.91	719.2	390.8	152.89	143.62
5	245.41	106.56	75.788	28.045	-193...
	174.07	159.34	164.3	135.55	120.25
6	100.53	43.538	57.481	53.464	286.51
	139.1	132.01	152.86	150.58	177.44



TRIGGER: Beam -- Matrix centered in Crystal of your choice

Crystal # 6 entries: 90130 mean: 98.396 rms: 147.22	Crystal # 7 entries: 90130 mean: 808.5 rms: 35.93	Crystal # 8 entries: 90130 mean: 82218 rms: 109.109
Crystal # 11 entries: 90130 mean: 69.411 rms: 159.28	Crystal # 12 entries: 90130 mean: 281.37 rms: 356.10	Crystal # 13 entries: 90130 mean: 92.249 rms: 109.97
Crystal # 16 entries: 90130 mean: 226.85 rms: 229.61	Crystal # 17 entries: 90130 mean: 1904.0 rms: 719.01	Crystal # 18 entries: 90130 mean: 302.13 rms: 397.12





	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
2	1002.0	1004.0	1006.0	1008.0	1010.0	1012.0	1014.0	1016.0	1018.0	1020.0	1022.0	1024.0	1026.0	1028.0	1030.0	1032.0
3	1004.0	1008.0	1012.0	1016.0	1020.0	1024.0	1028.0	1032.0	1036.0	1040.0	1044.0	1048.0	1052.0	1056.0	1060.0	1064.0
4	1006.0	1012.0	1018.0	1024.0	1030.0	1036.0	1042.0	1048.0	1054.0	1060.0	1066.0	1072.0	1078.0	1084.0	1090.0	1096.0
5	1008.0	1016.0	1024.0	1032.0	1040.0	1048.0	1056.0	1064.0	1072.0	1080.0	1088.0	1096.0	1104.0	1112.0	1120.0	1128.0
6	1010.0	1020.0	1030.0	1040.0	1050.0	1060.0	1070.0	1080.0	1090.0	1100.0	1110.0	1120.0	1130.0	1140.0	1150.0	1160.0
	11.0	22.0	33.0	44.0	55.0	66.0	77.0	88.0	99.0	110.0	121.0	132.0	143.0	154.0	165.0	176.0

