

SDHCAL

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A short history:

- ✓ The SDHCAL efforts using GRPC started in 2007
- ✓ Small GRPC chambers with HR1 readout electronics were built and tested in 2008
- ✓ Large chambers were developed and tested in 2009-2010 using HR2, HR2B
- ✓ Prototype construction started in September 2010 and completed in May 2011
- ✓ Commissioning tests took place in 2011. CALICE DAQ2 was not appropriate for the huge amount of data associated to SDHCAL.
- ✓ New DAQ system was elaborated and successfully tested on the prototype between December 2011 and March 2012 using cosmics.

Power-pulsing electronics was tested successfully shortly before the April&May TB and was used all the time after. The PP scheme was adapted to the PS and the SPS spill duration ($n \times 300$ ms (PS), 9 s (SPS) with a cycle of about 45 s. $n= 1$ (often) 2, 3 sometimes

48 GRPCs were used (one slab was out from the beginning but we did not change it). Two micromegas were put in slots 49,50.

2012 TB strategy

The PS TB was intended to

- ✓ validate the whole system (including the DAQ)
and to select the right thresholds values
- ✓ study low energy pions

The PS energy range is 1-12 GeV

for $E > 5$ GeV electron contamination is negligible

unfortunately we did not succeed to use correctly the Cerenkov counters to tag the electrons at lower energy (we have recorded however the information)

The beam conditions were well under control (intensity, size..)

Data taking efficiency was rather high.

N.B.

The two micromegas occupying the two last slots of our prototype were often off.

2012 TB strategy

The SPS TB was indented to

- ✓ Study energy resolution
- ✓ Electromagnetic -, hadronic showers.

The SPS energy range that was studied is

10-120 GeV for pions

10-80 GeV for electrons

However,

5 days of the allocated 14 days were lost (CERN global safety problem)

The beam conditions were very bad.

High local intensity (beam size very reduced)

In order to have good data we reduced the rate to 500-1200 pc/spill

N.B.

The two micromegas occupying the two last slots of our prototype were rather on but they introduced inefficiency to our data taking because of noisy ASICs

2012 TB strategy

Our aim with the first TB period was to

- ✓ see the prototype response with no calibration (all electronics gain were put to 1)
- ✓ localize noisy channels, noisy zones to correct for in next TB
- ✓ see the three thresholds effect and see how to use them in coherent way

The analysis goal is

- ✓ study energy resolution and linearity (pions, electrons) :

For this

- we use total number of hits (Nhits) but also those of the different 3 thresholds and use beam muons (half of our data) for calibration
- use topological variables (in N.N, PCM)
- ✓ develop algorithms to identify particles (pions, electrons, muons)
- ✓ compare data an simulation.
- ✓ Prepare successfully the next TB

Conclusion

The TB of April-May was satisfactory for what concerns the data quality
It was less satisfactory for what concerns the accumulated statistics
(10-30 k events per energy point > 20 GeV)

The data will be accessible to all of CALICE very soon (with the indications and tools to use)

We will try to present our results as often as possible and we will be happy that other groups participate to analyzing the SDHCAL data.

Thanks for all who took shifts to ensure good quality data

Day	Shift	Shifter1	Shifter2
Monday - 7	S2: 8h-16h	Imad	Jesus
Monday - 7	s3: 16h - 24h	MaryCruz	Sameh
Tuesday - 8	s1: 00h - 08h	Yacine	Simon
Tuesday - 8	s2: 08h - 16h	Mary-Cruz	Jesus
Tuesday - 8	s3: 16h - 24h	Jorge	Michael
Wednesday - 9	s1: 00h - 08h	Yacine	Arnaud
Wednesday - 9	s2: 08h - 16h	Imad	Sameh
Wednesday - 9	s3: 16h - 24h	Mary-Cruz	Jorge
Thursday - 10	s1: 00h - 08h	Michael	Jesus
Thursday - 10	s2: 08h - 16h	Yacine	Arnaud
Thursday - 10	s3: 16h - 24h	Jorge	Sameh
Friday - 11	s1: 00h - 08h	Michael	Roman
Friday - 11	s2: 08h - 16h	Yacine	Arnaud
Friday - 11	s3: 16h - 24h	Gerald	Sameh
Saturday - 12	s1: 00h - 08h	Jorge	Roman
Saturday - 12	s2: 08h - 16h	Jesus	Jeremy
Saturday - 12	s3: 16h - 24h	Jorge	Kais
Sunday - 13	s1: 00h - 08h	Gerald	Arnaud
Sunday - 13	s2: 08h - 16h	Yacine	Jeremy
Sunday - 13	s3: 16h - 24h	Imad	---
Monday - 14	s1: 00h - 08h	Jesus	Gerald
Monday - 14	s2: 08h - 16h	Imad	Arnaud
Monday - 14	s3: 16h - 24h	Jorge	Nicolas
Tuesday - 15	s1: 00h - 08h	Gerald	Kais
Tuesday - 15	s2: 08h - 16h	Yacine	Arnaud
Tuesday - 15	s3: 16h - 24h	Jorge	Jesus
Wednesday -16	s1: 00h - 08h	Nicolas	Kais
Wednesday -16	s2: 08h - 16h	Yacine	---
Wednesday -16	s3: 16h - 24h	Jesus	---
Thursday - 17	s1: 00h - 08h	Jorge	Sameh
Thursday - 17	s2: 08h - 16h	Yacine	Kais
Thursday - 17	s3: 16h - 24h	Nicolas	Jesus
Friday - 18	s1: 00h - 08h	Mary.Cruz	Sameh
Friday - 18	s2: 08h - 16h	Jorge	Manqui
Friday - 18	s3: 16h - 24h	Kais	Jesus
Saturday - 19	s1: 00h - 08h	Arnaud	Yacine
Saturday - 19	s2: 08h - 16h	Mary-Cruz	Jesus
Saturday - 19	s3: 16h - 24h	Kais	Sameh
Sunday - 20	s1: 00h - 08h	Jorge	Nicolas
Sunday - 20	s2: 08h - 16h	Jesus	LAPP
Sunday - 20	s3: 16h - 24h	Arnaud	LAPP
Monday - 21	s1: 00h - 08h	Gerald	Nicolas