

# Summary of Test-beam Analysis Meeting - 4 August 2004

Participants: T.Blake, A.Giacomin, S.Koestner, M.Needham, O.Steinkamp, H.Voss

Summary: O. Steinkamp

## Matt's Slides

- Matt has looked at the data from the first pulse-shape scan. His slides are available at <http://agenda.cern.ch/fullAgenda.php?ida=043532>
- S/N values for the CMS3 and the LHCb1 ladders agree well with last year's results. The S/N for the CMS+flex ladder is slightly higher than expected from the measured capacitance.
- Relative dip sizes for the CMS3, CMS+flex and LHCb1 ladders are consistent with last year's results. Relative dip sizes for the Irrad1 ladder are significantly smaller than those observed for un-irradiated ladders. It was speculated whether this could be due to a change of the field configuration in the region between strips, caused by radiation damage at the Si/SiO<sub>2</sub> interface. Radiation damage is known to have an effect on the inter-strip capacitance. This idea should be discussed further.
- Comparing the measured noise performance of the Irrad1 ladder and the LHCb1 ladder, Matt tried to estimate the relevant "shaping time"  $\tau$  that should go into the noise formula for leakage-current induced shot noise. Making some assumptions (see his slides), he obtains values around 15 ns, close to the rise-time of the signal and significantly smaller than its FWHM.

## Tom's Slides

- Tom and Stefan have looked at HV scans, with special emphasis on trying to understand the data taken on the last weekend. Tom's slides are available at <http://agenda.cern.ch/fullAgenda.php?ida=043532>
- S/N values for the LHCb1 ladder are too low for the three first runs taken on Saturday morning, whereas two points taken later on Saturday are consistent with data taken before the weekend. Dima was on shift Saturday morning, he will be interviewed to find out more about possible problems during data taking.
- S/N values for the Irrad1 ladder are a much too high for all five runs taken during the weekend. Leakage currents for these runs were approx. 30% smaller than for earlier runs but a quick calculation shows that this fact alone cannot explain the observed difference in S/N. Leakage current values were extracted from the handwritten logbook.
- Trigger delays for the Irrad1 ladder are consistently smaller for the runs taken on the last weekend than for earlier runs. For the LHCb1 ladder, the trend is less clear

since points are more spread out. Overall, trigger delays for the LHCb1 ladder are significantly shorter than for the Irrad1 ladder. Since this difference could be due to different delay times in the electronics chain, there is probably not much to learn from this observation.

- Strong indications were found that HV channels for the CMS3 and the CMS+flex ladders were swapped for all runs taken on the last weekend. The high S/N values measured for the CMS+flex ladder are consistent with the bias voltage of 275 V that was supposedly applied to the CMS3 ladder for all these runs. Also, the leakage currents supposedly measured for the CMS+flex ladder for these runs are much smaller than those measured for earlier runs but are of the same order of magnitude as those typically measured on the CMS3 ladder.
- For several of the HV settings, the mini delay scans look strange. The suspicion was raised that one of the switches on the delay module may not have functioned properly. One of the Zürich delay modules is known to have a “sticky” switch.

## Plans

- Tom will prepare plots of signal in ADC counts, or signal normalised to header amplitude, as a function of bias voltage. This is to understand whether the observed strange behaviour of S/N is due to changes in signal or in noise.
- Data will be re-processed, to include information on leakage currents and on header amplitude in the pre-processed data files.
- Stefan, Tom and Aurelie will check data quality and alignment for all runs and establish a list of good runs. Michael’s list of good runs for the beam telescope can serve as a starting point.
- Stefan and Tom want to try out a Poissonian fit to pulse shapes. Results should be compared to Matt’s method of fitting a Parabola to the three data points around the maximum signal.
- Christian has not yet been contacted for the jitter measurement (see summary of last meeting). Olaf will do this now.
- Matt will try to find out whether the faulty delay module was used in the test-beam.
- Stefan volunteered to have a look at the theory behind the shot-noise formula.
- The next meeting will be on August 27 at 14h00, again by telephone.