
Minutes: SBS Meeting June 29, 2016

Agenda: Evaristo Cisbani - SBS Front Tracker (INFN GEMs)
Rachel Montgomery - NINO Board Crosstalk Studies

Attendees: Brian Quinn, John Annand, Evaristo Cisbani, Rachel Montgomery, Mark Jones, Mitra Shabestari, Dasuni Adikaram, Kondo Gnanvo, Vladimr Nelyubin, Seamus Riordan, Ralph Marinaro, Abbie Salyzyn, Parker Reid, Peter Monaghan, Andrew Puckett, Nilanga Liyanage, Caesar Jackson, Bogdan Wojtsekhowski.

Evaristo - SBS Front Tracker; Tracking with INFN GEMs

- Mechanical design of the GEM
 - External frame of the GEM chamber is finalized
 - INFN GEM Chamber #0 and #1 (prototypes) at JLab
- Cosmic Tests
 - Cosmic Test setup and trigger
 - Event display results for modules 8, 9, and 10
 - APV signal analysis
 - Validation of error function criteria for cosmic data
 - Presenting the results of: collected charge, maximum charge, x-y correlations for modules (8, 9, 10), and cluster position for modules
- First Tracking
 - Results of tracking linear fit
 - Rough manual alignment
 - Developed tools for precise tracking
 - Attempt to implement promising RETINA algorithm for hit aggregation
- Future plans:
 - Integrate Scintillator ADCs into the analysis
 - Improve alignment
 - Consolidate «Erf» method for hits selection
 - Analyse the collected data
 - Fix unconnected sectors
 - Add modules to the cosmic setup

Rachel - NINO Board Crosstalk Studies

- Introducing the setup for both SBS CDet & BB GRINCH boards
- Explaining different methods and electronics
- Results of Method 1:
 - Input signal from generator on one channel
 - pedestal run
 - ADC spectra of amplifier outputs
 - Smaller fraction below pedestal cut implies higher number of counts above i.e. possible crosstalk signals
 - Next neighbour always affected the strongest, even with input on different channels/ different NINO chip
- Search for Digital Hits Caused by Crosstalk
- Observed larger values in Rev D1 next-neighbour compared to Rev G
- Overall - values tiny/negligible and almost exclusively do not cause digital hits
- Results of Method 2:

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- Stable signal fed to one input of NINO using NIM electronics
 - Neighbouring pulse did not have any significant effect on the input signal timing
 - With input signal just below threshold (3mV), no digital hits were found for any of neighbouring pulses tested
 - Results of Method 3:
 - Delay between input signal and neighbouring channel signal varied
 - Repeated delay scan of 40mV neighbouring channel with true input signal just below threshold at 3mV, but recorded no digital LVDS hits in below threshold channel
 - Any fluctuation in mean time with control sample is tiny and mostly within ~1TDC bin
 - Fluctuation in mean time with control sample is larger than for 7mV when the neighbour pulse is before and coincident with the input
 - Summary:
 - Several tests were performed to study possible crosstalk effects in the NINO readout boards
 - Overall level of analogue crosstalk is not of a major concern to cabling, although it is most likely to affect the next neighbouring channel
 - Crosstalk in the digital line is most likely to affect neighbouring channels and signals which are at/just above threshold on a small-scale, but for signals which are already a few mV above threshold this effect is negligible