

奈良女テストベンチ
Workfest 2020

NWU Test Bench Missions

Task List

1. Further understanding of ladder performance
 - 3% inefficiency (Timing ?)
 - Data timing study (can be tested with Cosmic ray and Test pulse)
 - Inefficiency by massive data from crazy chips

} Data analysis (software)

 - Timing jitter among ladders
 - Long time stability of DAQ (noise + cosmic ray) for at least 24h

} Work at test bench (hardware)
2. Upgrade the test bench
 - Data from Trigger counter recorded by CAMAC
 - Necessary to study the data timing wrt clock.

} Work at test bench (hardware)
3. Bus extender tests
 - Data analysis is going for Eye diagram
 - Thermal shock test (Apr. 9 – May 20, 40 days)
 - New prototype production (End of May)

} Data analysis
} Work in parallel with BE R&D team
4. QA for new ladder
 - MIP test by Cosmic ray and RI source (β -ray)

good to start after May 7th
5. Upgrade LV control system for full detector
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} Work at test bench (hardware)
6. INTT multiplicity trigger
 - Feasibility study with GEANT + HIJING

Data analysis

2020/4/8

I would like to focus on them, especially 1)-4) in this 2-3 months,

NWU plan

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Additional Task Request to NWU in June

1. Implement noise trigger to calibration to evaluate the noise performance
 - a. Injecting clock trigger to FEM test pin as the external trigger mode
 - b. Implement clock trigger to the firm ware
2. Multiple $\frac{1}{2}$ ladder simultaneous readout test.
3. Multiple column readout of ROC.
4. FEM-IB debugging.
5. Implement channel vs. ADC in the calibration analysis code?
6. Can NWU test a NCU ladder for double check?

Ladder Performance Check Procedure

STEP	Test	Condition	Purpose	Status
1	Visual Inspection		Check all components and wirebondings with micro scope	
2	Calibration	Bias on	Wirebonding btwn FPHX and HDI. FPHX health check.	
		Bias off		
3	Bias Scan	Bias on HV vs. Current	Wire bonding btwn FPHX and Silicon. Ground contact/short.	
4	Noise	Bias on, self-trigger	Noise distribution and rate.	
5	Source	Bias on, external trigger by a scintillator	Find dead channel in silicon sensor	
6	Cosmic Ray	Bias on, external trigger by sandwich scintillators. Multi-layered ladders.	Uniformity of the entire area and MIP observation. Long term stability,	

1. Visual Inspection

- ❑ Take photos to prove following check list
- ❑ Are all FPHX chips aligned in the right position?
- ❑ Are there any spilt silver epoxy?
- ❑ Do wirebondings look OK between FPHX and HDI?
- ❑ Do wirebondings look OK between FPHX and Silicon?
- ❑ Are there two wires bonded between guard ring and GND pad on HDI in 4 corners?
- ❑ Are there two wires bonded between bias ring and GND pad on HDI in 4 corners?

2. Calibration

1. Run calibration without bias voltage.
2. Run calibration with bias voltage. Record leakage current at 50V and 100V.
3. Check if FPHX chips responses OK to each slow control commands of start run sequence
4. Check masking feature of FPHX chip (may need to develop the firmware)
5. Evaluate number of dead channel for each chip
 1. Amplitude vs. ADC slope difference btwn bias on/off ch-by-ch
 2. Channel vs. ADC
6. misc

What to do with NCU 1st ladder?

- The 1st ladder will be assembled in April at NCU.
- It was planned to be shipped to BNL before the beam test.
- We are not sure if our access to the lab will be restored in April.
- NCU may want to evaluate 1st ladder performance locally as much as possible including cosmic/source tests.
- Trigger scintillators are to be setup in NCU.