ANNIE Status

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AEM :: June 13, 2016
High Voltage Issues Resolved

- Pigtail connector on a negative HV card failed
  - Ordered new connector parts and enlisted Wayne Johnson (NML) to help us rebuild it (along with a spare)
  - Connector (plus spare) build and installed

- Mild sparking in splitter boxes at high voltage (~1600 V)
  - Sparking along the bottom of some of the capacitors
    - Tested and verified with a spare box at ISU
  - Due to flux residue trapped under the capacitors
  - Cleaned, conformally coated applied, and tested to at least 2500 V
  - No issues since the cleaning

- A handful of tank PMTs have high current when powering on
  - Suspect possible water sweeping into the cable
  - Running at low voltage (when not in use) prevents high currents from reoccurring, still investigating
  - These PMTs are not necessary for ANNIE to meet Run I physics goals
  - No major issues since kept at operational voltages, still regularly monitored
DAQ and Data Taking

- HV webpage for easier monitoring/control
- Upgrades to DAQ and ADC readout firmware
  - Data downsampling to improve data transfer rates
  - Zero suppression (not implemented yet)
  - Per-channel digital delays, with 2 nsec resolution (will replace lemo cables)
  - DAQ can now trigger on beam, external (flasher) signals, or software
- Running up against full disk on the DAQ machine
  - Stops data taking
  - Working with Art K. to remove raw data off the machine once copied and verified offline

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Before

Preliminary

After

Preliminary
Veto Wall/MRD Rates

- Groups of up to 16 PMTs are combined into discriminator
  - Veto (2 layers of 13 PMTs each)
  - MRD layer 2 (2 halves of 13 ↔ paddles each)
  - MRD layer 3 (2 halves of 14 ↓ paddles each)
  - Each pair of discriminators is daisy-chained into a single ADC channel
- Seeing unexpectedly low rates
  - For a single run (R67, taken May 30th) : 142 MRD Layers 2+3 coincidences, eight coincidences between the Veto + MRD Layer 2, three coincidences between Veto + MRD Layer 3, and one event with coincidences in all three layers (out of 1.6x10^6 triggers!)
- Investigating
  - Measure discriminator values on various PMTs, bad splitter boards?
- Increased the operational voltage of the MRD layers
  - Layer 2 increased 200 V, Layer 3 up 500 V
  - Waiting for beam to return to test
Plans for the upcoming week

• Continue taking data with the NCV in place
  – Establish run plan for various NCV locations
• Start taking 24/7 shifts (once BNB returns)
  – Acquire further operational experience
  – Training new shifters (in remote locations)
• Continue to analyze data
  – Determine cosmic muon rates
  – Search for neutron captures
  – Take additional LED flasher data