NPS Calorimeter Prototype:
Status 06 March 2014

Ongoing activities:

- The new active HV divider components have been ordered and delivered.
- The paperwork for ordering the boards for the HV dividers were submitted on 12 February, but for some unknown reason the purchase order has been sent out from JLab only recently.
- Looking for the PMT R4125 and dividers taken in 2013 by collaborators for the various tests. I have sent email to FIU (Pete and Joerg) asking to return one PMT R4125 with divider taken last year. No response so far.
- We have ordered Photodiode S2281 which we will use for the measurement of absolute intensity of the LEDs in the wavelength range 200-1100 nm. (for this we will need support from Carl Zorn and use his test setup).
- Recently Arshak did transmission measurements for one PbWO crystal using Carl Zorn's setup in the ARC. This was mostly for training purposes to get familiar with the setup.

Open questions for the prototype design:

- What material is preferable to use for the prototype frame ? Cu or Al ? Need to take into account thermal conductivity and residual activation after tests in real background condition (in Hall A).

Open questions for the monitoring system:

- There are some important factors which need to be taken into account selecting the light source for the NPS light monitoring system.
    - The source should be as stable as possible. The reference photodiode coupled to the primary light will take out pulse-to-pulse instabilities, but it is still useful if the primary light is stable on short-term and long-term time scale.
    - The intensity of the primary light that is produced must be high enough. The distributed and delivered light to each crystal must have an intensity equivalent to the energy of around 1-3 GeV.

    - The timing distribution of the pulses must be similar to that of a crystals pulse.

- All these requirements are straightforward to do if only one type of crystal is used in the calorimeter (or crystals with very similar characteristics). But our alternative version of the NPS calorimeter will combine PbWO and PbF2 crystals. Note, for $PbWO_4$ crystal the mechanism is pre-dominantly scintillation light, while it is pure Cherenkov for PbF_2). Also, the output pulse timing and shape are different. If this difference is significant then it may require a different digital filtering. (It would be preferable to use the same digital filtering for actual physics events and light pulsar events).

- In addition, the active bases used for R4125, PMTs will change the shape of signals from PbWO4, and this must be taken into account. Finally, the dimensions and different optical properties of the $PbWO_4$ and PbF_2 crystals will require different intensity for the monitoring light.