

HAWC Optical Calibration

Some Near-term Issues

John A.J. Matthews

johnm@phys.unm.edu

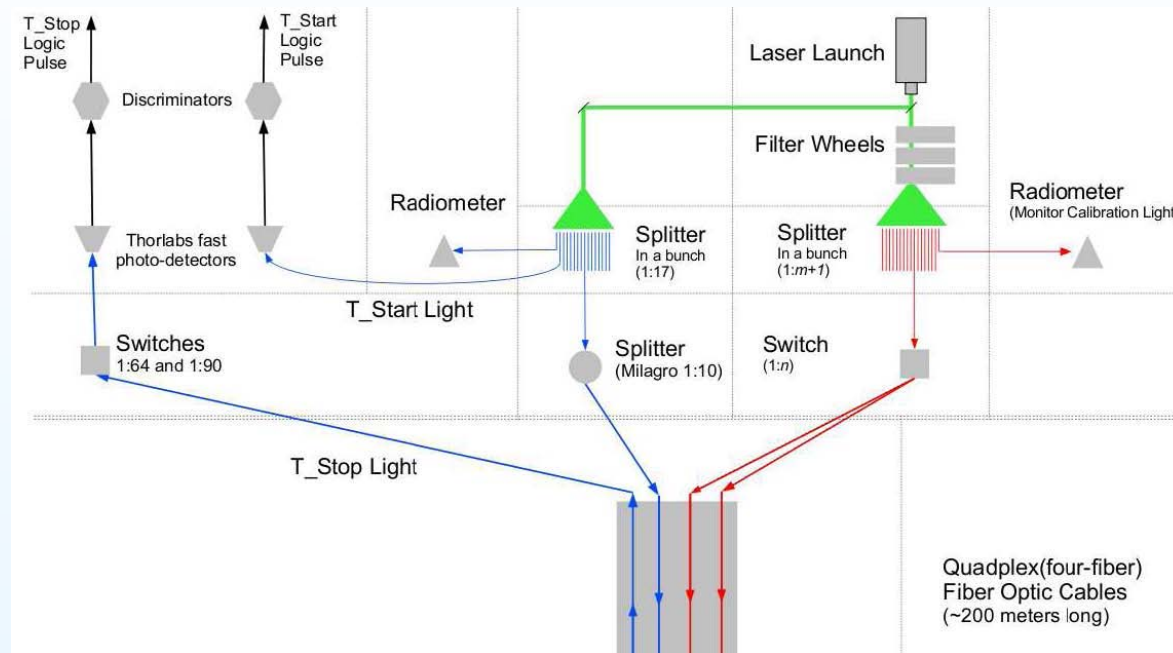
University of New Mexico

Albuquerque, NM 87131

Calibration system: CSU/MTU goals

- The CSU and MTU calibration systems goals include:
 1. Confirm that the calibration hardware, and control software, is matched to the task.
 2. Develop the software tools for all of the calibration analyses.
 3. Study calibration statistical and systematic errors: are they matched to the task?
 4. Monitor the stability of the calibration constants VS time.

Calibration system: *CSU upgrades*



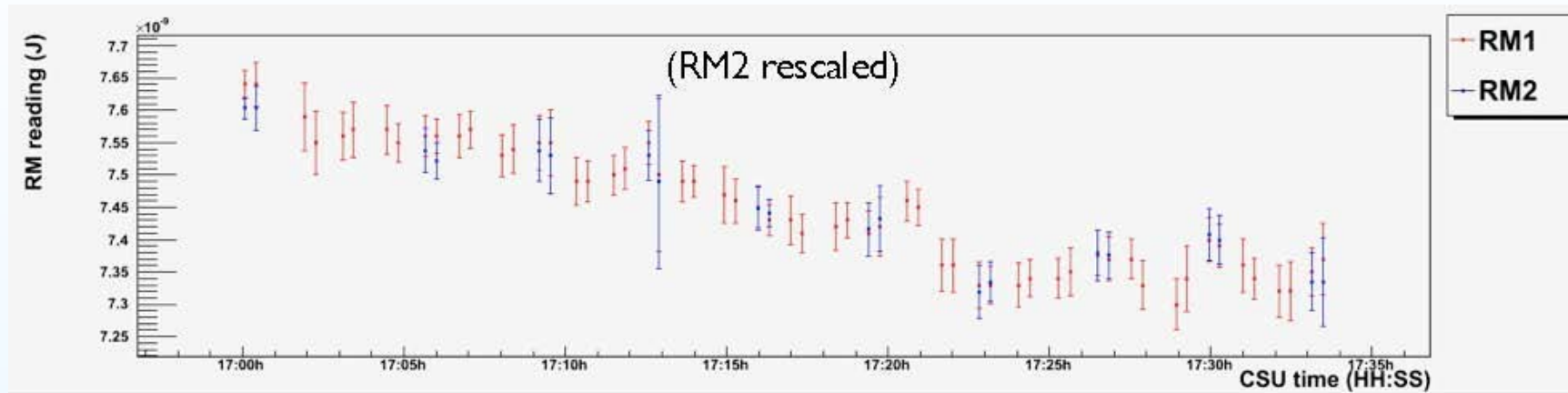
- Possible upgrades for the prototype system at CSU include:
 1. Reconfigure the ND filters (in the 3 FWs) to allow finer steps in light intensity
 2. Move the *round-trip* timing loop to the 600' fiber
 3. Make the CSU system match the system planned for HAWC:
 - Add a 1:16 DiCon optical switch
 - Replace BN555 pulser with new BN575-2C pulser
 4. Test alternate discriminators for the T_{start} and T_{stop} signals

Calibration system: *MTU/Move system to HAWC*



- In the near (??) future we need to ship a calibration system to HAWC:
 1. What studies (*e.g.* laser stability studies) need to be completed at MTU?
 2. What additional parts (*e.g.* 600' optical distribution fibers, 1:2 splitters, 15m fibers, ...) need to be purchased?
 3. What additional parts (*e.g.* optical diffusers, buoy-assembly and weights) need to be fabricated?
 4. What decisions (*e.g.* calibration control computer, coordination of shipping, calibration room layout, ...) still need to be made?

Calibration system: *errors ...*



- Now that we have a complete (??) first analysis:
 1. How sensitive are the calibration constants to possible variations in the laser (radiometer) intensities?
 2. Do we have a good understanding of statistical and systematic errors in the *occupancy* fits?
 - (a) alternative analyses
 - (b) uncertainty in the predictions for $\langle n_{PE} \rangle$ VS ToT
 3. How stable are the T_{start} and T_{stop} signals to (laser) pulse intensity and pulse shape?
 4. ...