

QuarkNet



# Helpful Ideas

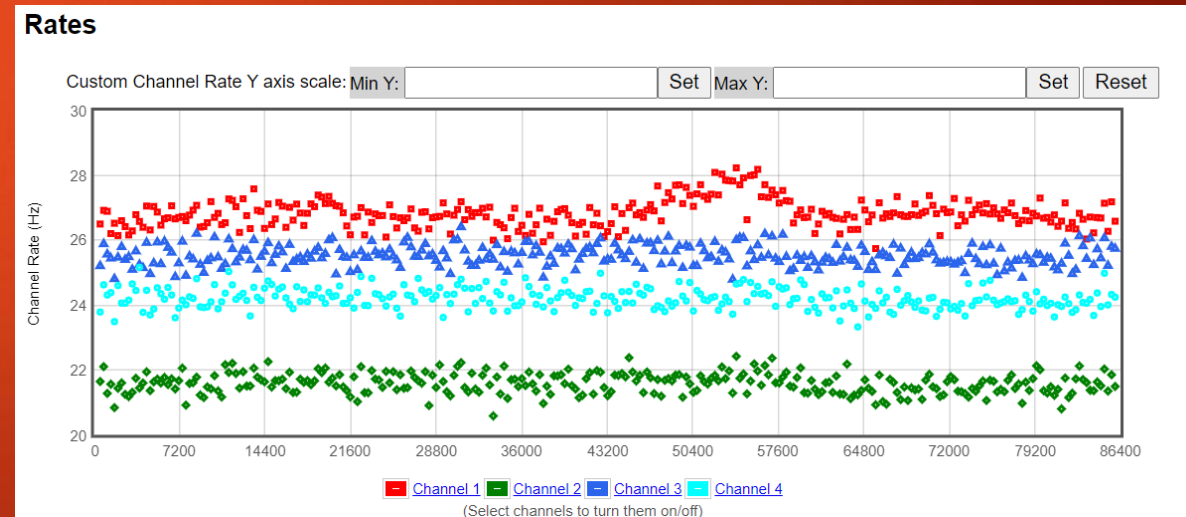
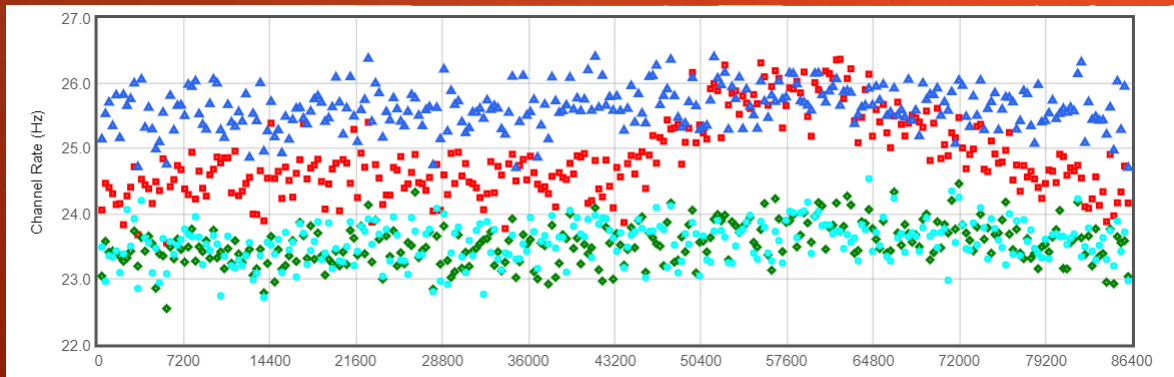
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# Detector Calibration

- ▶ Plateau
- ▶ Temperature sensitivity
- ▶ Light leaks



# Detector Calibration continued

- ▶ Barometer Calibration and altitude limits (also accelerometer limits)
- ▶  $t_0$  wire length/timing
- ▶ Multiple detectors, normalization

# Barometer Calibration

- ▶ Does not work at altitudes above 3300 feet.
- ▶ Many smartphones have a barometer. Use *Physics Toolbox Suite* or *Phyphox* to access.
- ▶ On the Command Prompt in Equip, enter BA <Enter>
- ▶ Returned information gives a 4-digit number and the pressure reading, Adjust the 4 digit number (voltage) by typing BA nnnn
- ▶ Once the correct reading is received, enter 'SA 1'



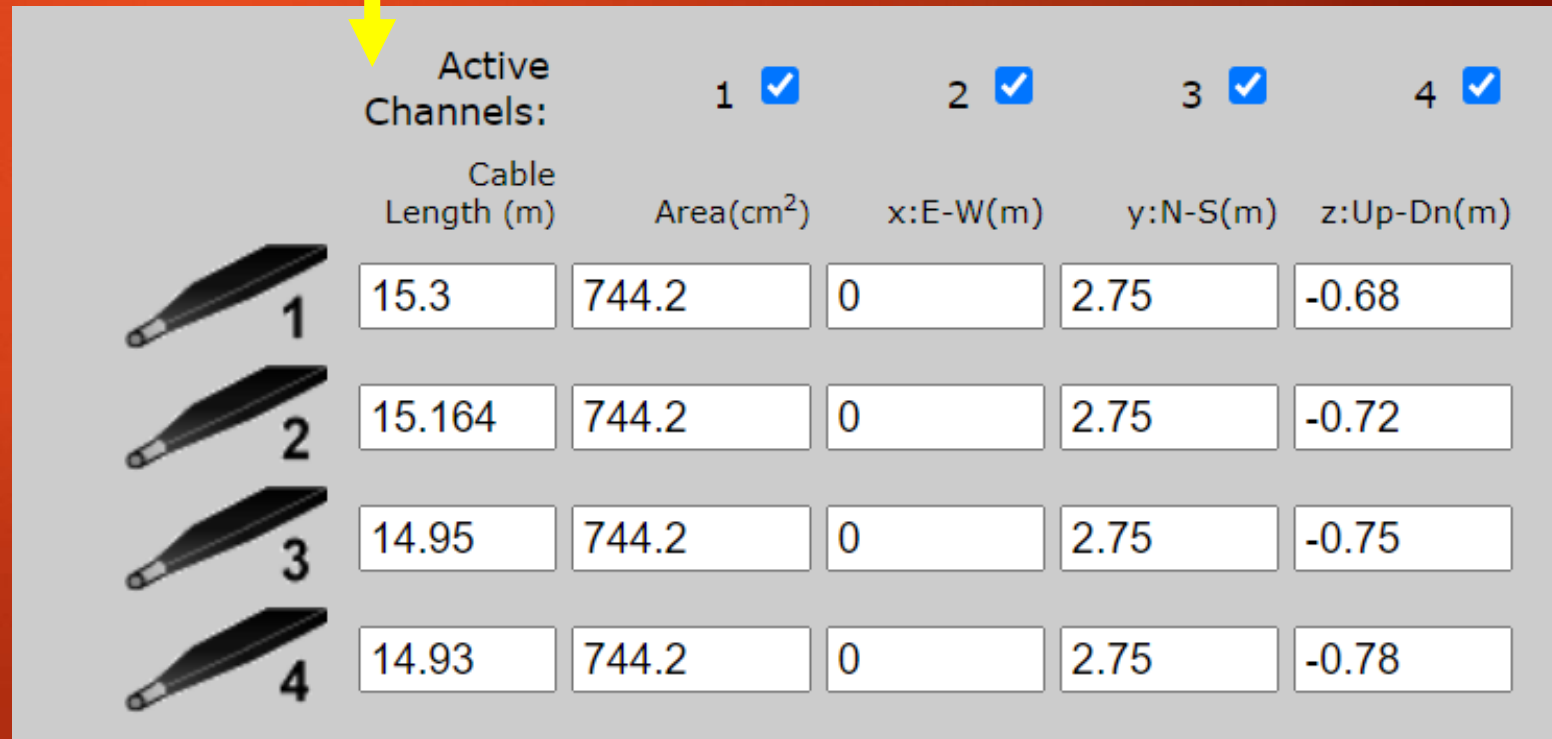
# T<sub>0</sub> Wire Timing Calibration





- ▶ Use Channel 1 as a reference (do not change)
- ▶ Tightly stack Counter 1 with Counter 2. Disconnect the other channels. Do a minimum of 10 minute trial.
- ▶ Analyze using the Time of Flight tool. The time should be under 0.1 ns. If yes, do the same with Counter 3, etc. If not:



# T<sub>0</sub> Wire Timing Calibration continued

- ▶ In Geometry, adjust the Cable Length. It is about 4.9 ns per meter. Save and rerun Time of Flight. Keep changing iteratively until you are under 0.1 ns in TofF.



	Active Channels:	1 <input checked="" type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input checked="" type="checkbox"/>
	Cable Length (m)	Area(cm <sup>2</sup> )	x:E-W(m)	y:N-S(m)	z:Up-Dn(m)
 1	15.3	744.2	0	2.75	-0.68
 2	15.164	744.2	0	2.75	-0.72
 3	14.95	744.2	0	2.75	-0.75
 4	14.93	744.2	0	2.75	-0.78

# Multiple Detectors

- ▶ BEST
  - ▶ Run in same geometry in the same room at the same time.
- ▶ ACCEPTABLE
  - ▶ Run the same geometry at the same time.
- ▶ Compare flux rates

# Tools and Enhancements

- ▶ Box for PDU and DAQ (Indoors box versus Outdoor box)
- ▶ Spacers
- ▶ Knobs and Standoffs
- ▶ Labeling
- ▶ Tape Measure
- ▶ Inclinator
- ▶ Wire hygiene
- ▶ Tote box
- ▶ Shelving
- ▶ Safety plaque



# Tools and Enhancements continued

- ▶ Box for PDU and DAQ



Indoor



Outdoor

- ▶ Spacer



# Knobs and Standoffs

- ▶ Ribbed Knob 0.125" MPKG40B18 Digi-Key 679-3543-ND
- ▶ **OR** Jameco Knob 1/8 " JK-901D-3 .2 SKU 2239111



- ▶ Stand Offs/Spacers
  - ▶ Arndt Electronics 0.250" hex female 8 – 32 thread 2112-832A
  - ▶ Arndt Electronics 0.0250" hex m/f 8 – 32 thread 4542-832A
- ▶ **OR** Hex Standoff 4-40 Alum 1" 1772-1107-ND Digikey
  - ▶ Hex nut 3/16" steel 4-40 SKU 36-4694-ND Digikey

# Tools and Enhancements continued

- ▶ 50 meter Tape Measure



- ▶ Inclinator



- ▶ Velcro Ties



# Tools and Enhancements continued

27 gallon Tote box



Shelving



Safety Placard

**Safety Placard**  
Cosmic Ray Detector -- New Trier Northfield

**FIRE \*\*\*\* POLICE \*\*\*\* AMBULANCE**

**Press 8-911**

NO known hazards

NFPA	HMIS
0	Health Hazard 0
0	Fire Hazard 0
0	Reactivity 0

Electricity: 120 v AC to 5 v DC, under 3 amps  
No Personal Protection Equipment required.

**Responsible Staff Persons**  
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# Computer

- ▶ If you have problems interfacing with school network:
  - ▶ Tell IT to set up the program, turn off updates, turn off sleep mode. Verify interface and data saving.
    - ▶ Current Java Script problem
  - ▶ Disconnect WiFi
  - ▶ Shuttle data to eLab with thumb drive
  - ▶ Local computer ID signon (NOT network)
- ▶ Place sign: *Experiment in Progress*

# Collaborations with Other Schools

- ▶ Administrative cooperation
- ▶ From school 'rivals' to 'team cooperation'
- ▶ Normalization of data
- ▶ Control Detector



# Posters

- ▶ How CRMD works
- ▶ Proposals
- ▶ Experiments

# Current Enhancements to eLab

- ▶ Checking and Updating all links
- ▶ Refining some help menus
- ▶ Tandum information in [Quarknet.org](http://Quarknet.org)



# Questions?



# Contact

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