Flasher Asymmetry and Hole Ice Properties

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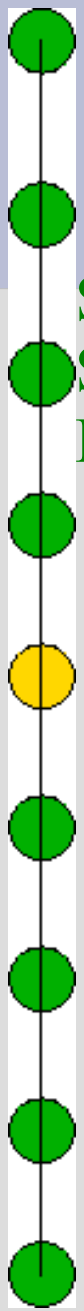
Flasher Data

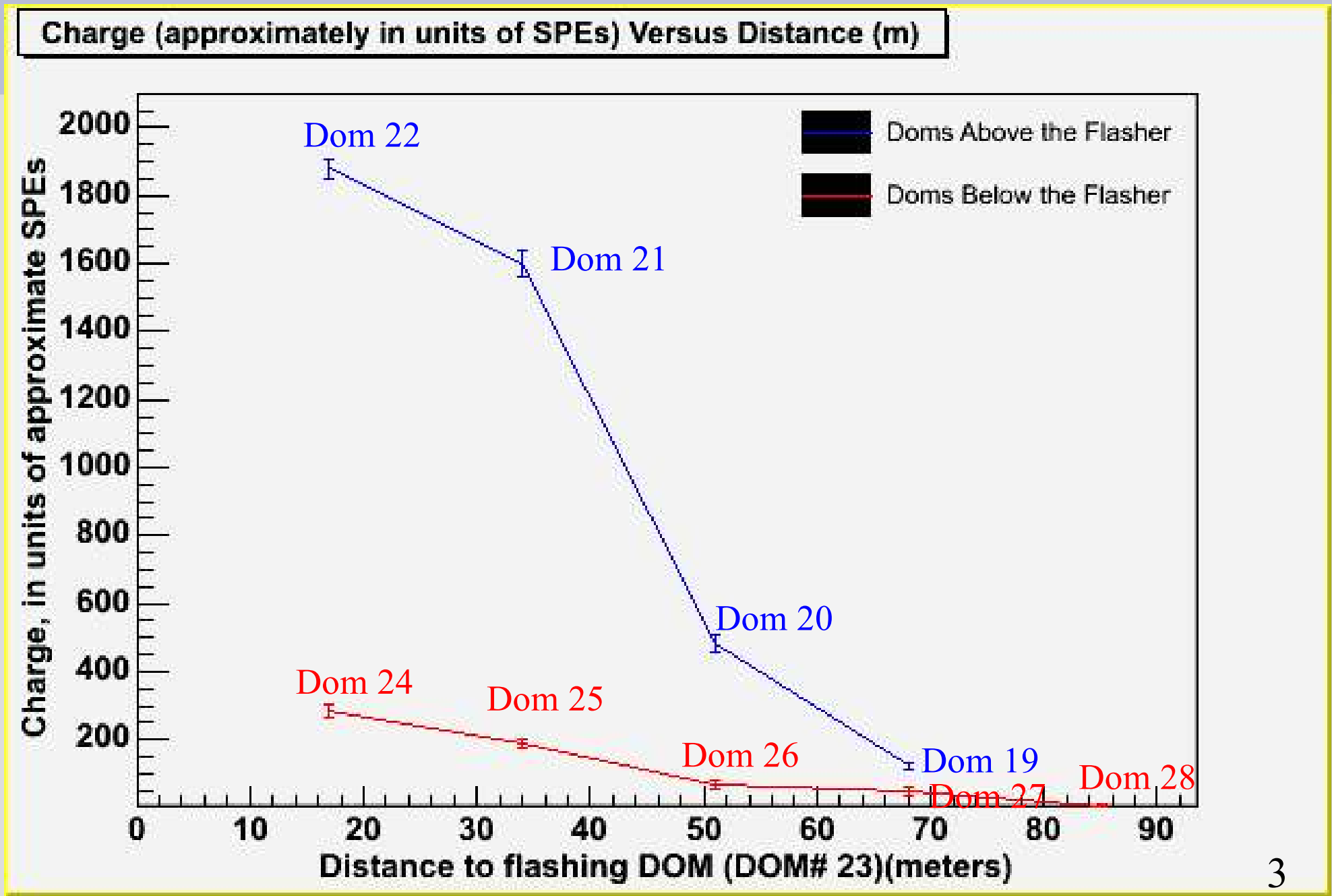


Set ATWD Channel(s).
Set FADC
Record Data.

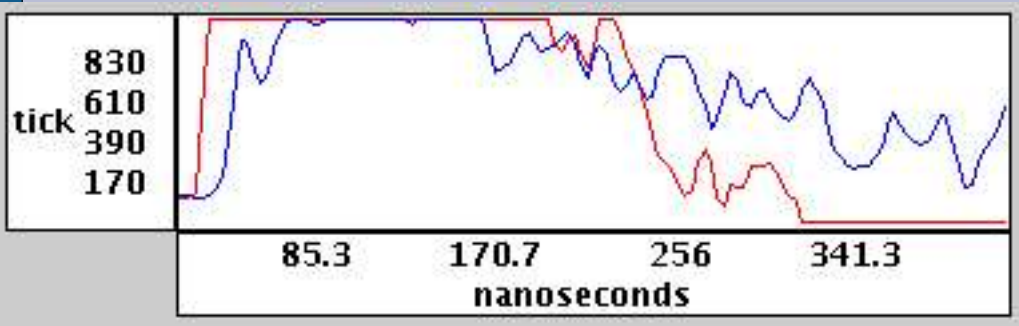
Flash LEDs.
Do Not record data.

- 2 Data Sets
  - Dom 23 (Lemur)
    - Earlier in the year
    - Mini String (~10 DOMs)
    - Full ATWD Readout
  - Dom 52 (Nitrogen)
    - More Doms than mini string
    - Bottom of the String
    - 32 Samples in each ATWD Channel
    - Only the first ATWD Channel

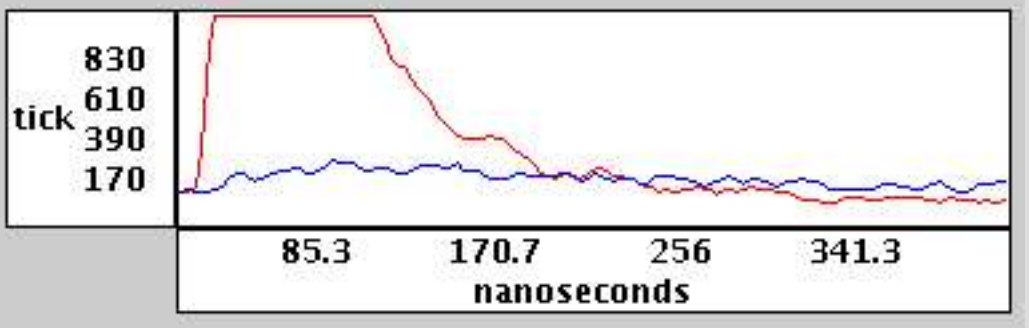
Flasher Asymmetry: Run 428



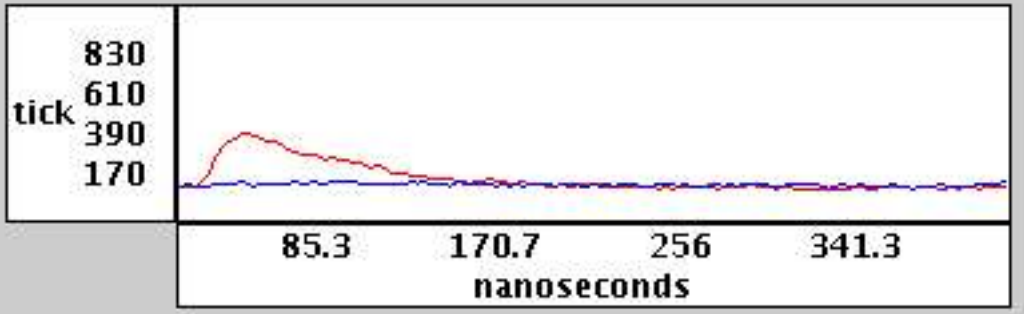
Waveforms



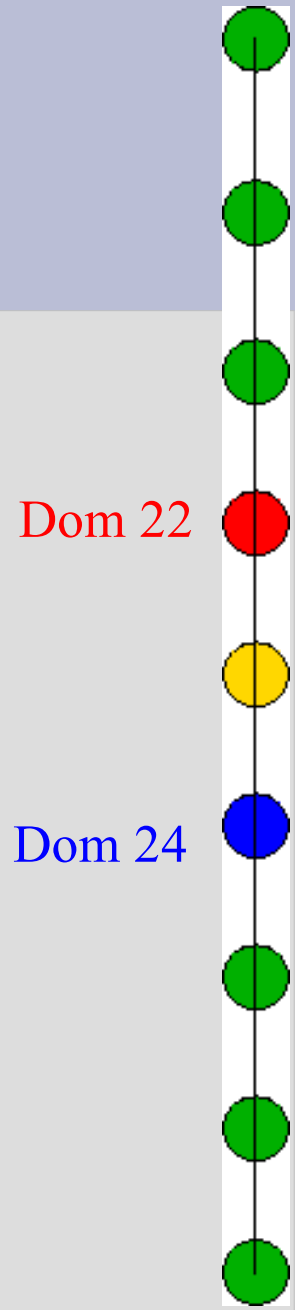
ATWD Channel0



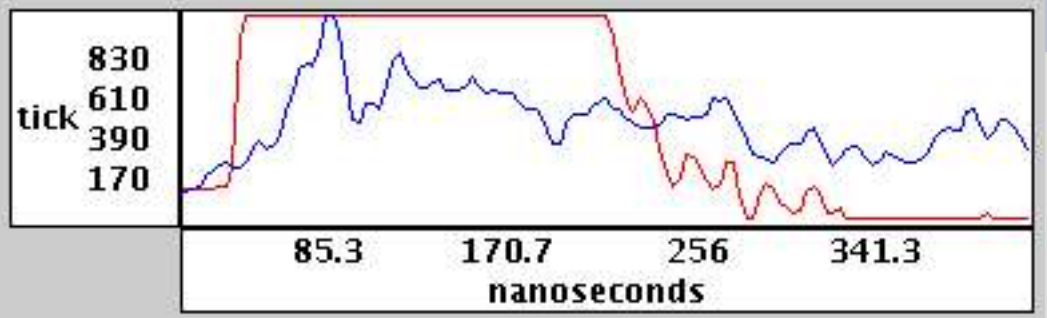
ATWD Channel 1



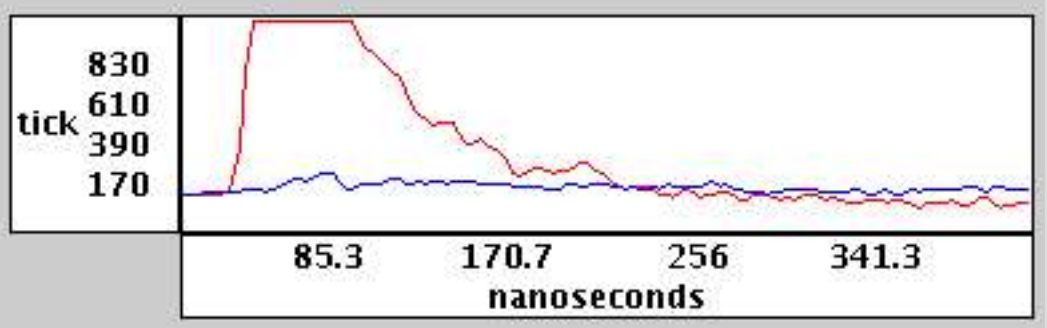
ATWD Channel 2



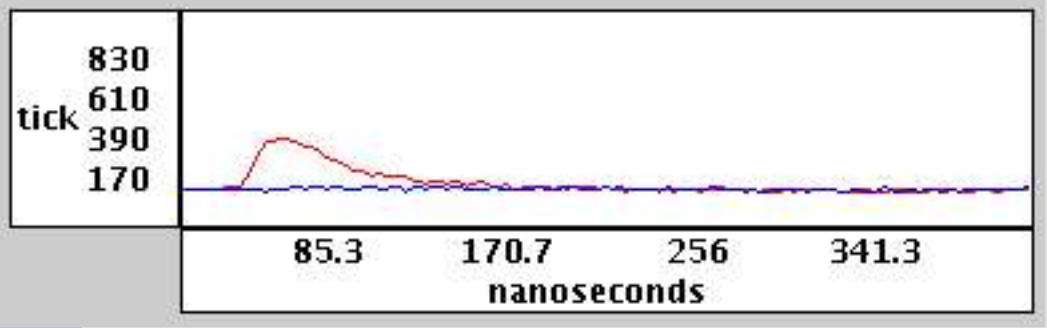
Waveforms II



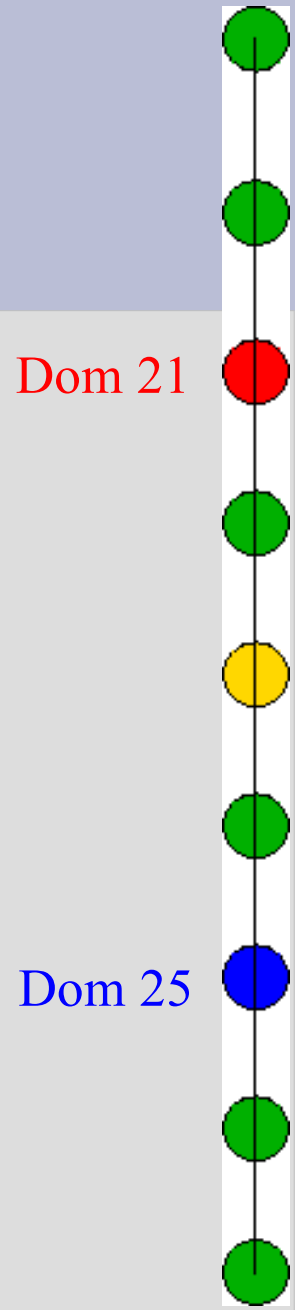
ATWD Channel 0



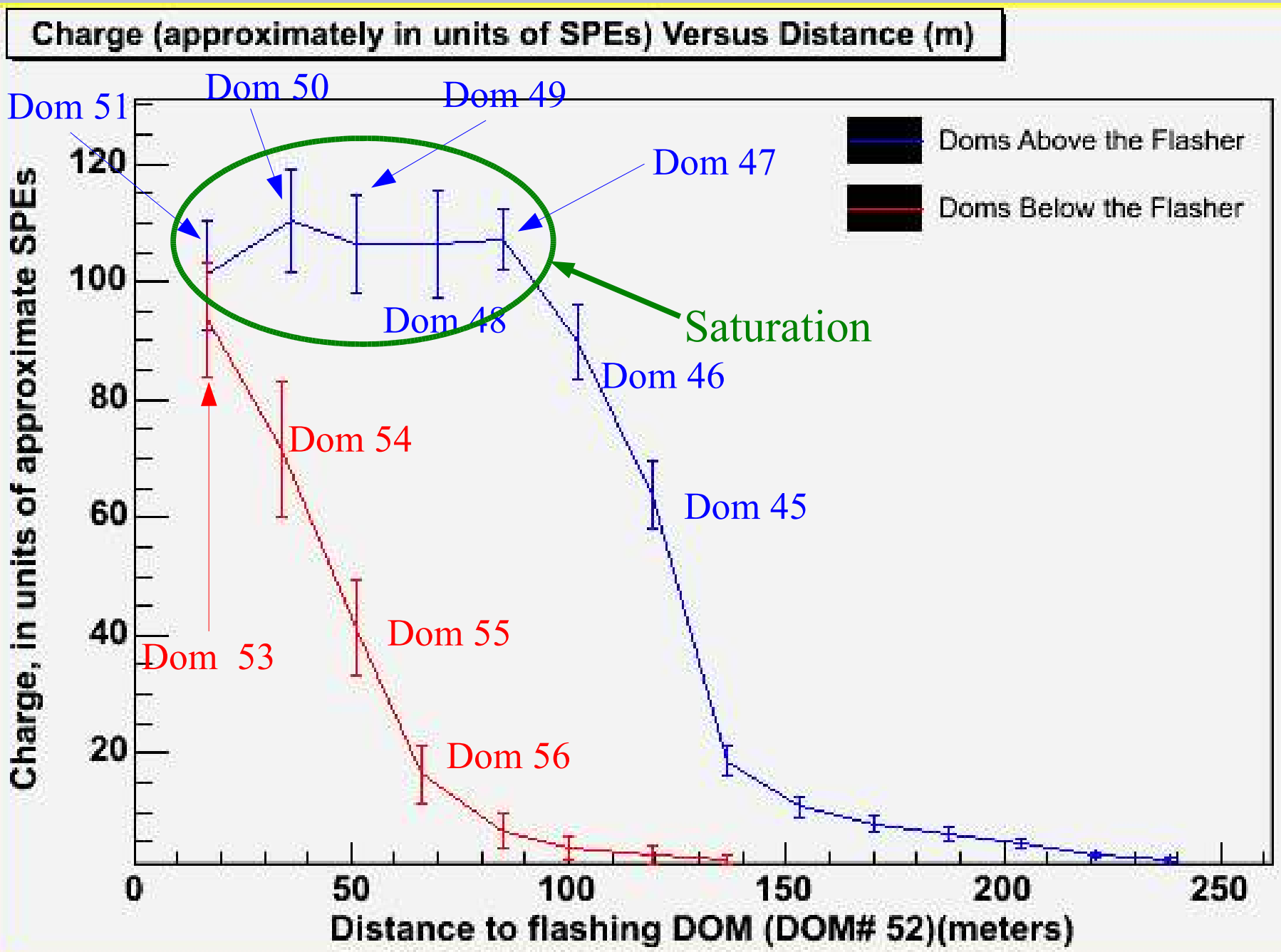
ATWD Channel 1



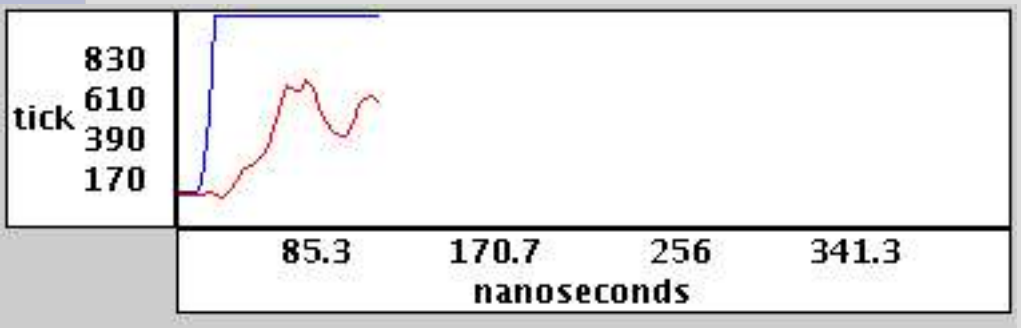
ATWD Channel 2



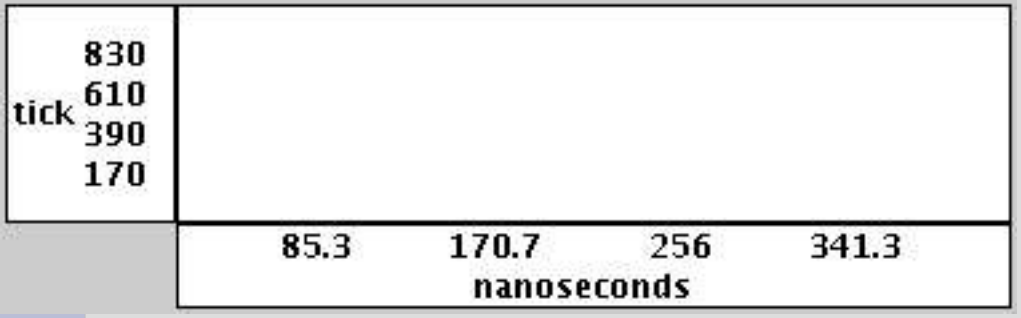
Flasher Asymmetry II: Run 2993



Waveforms III



ATWD Channel 0

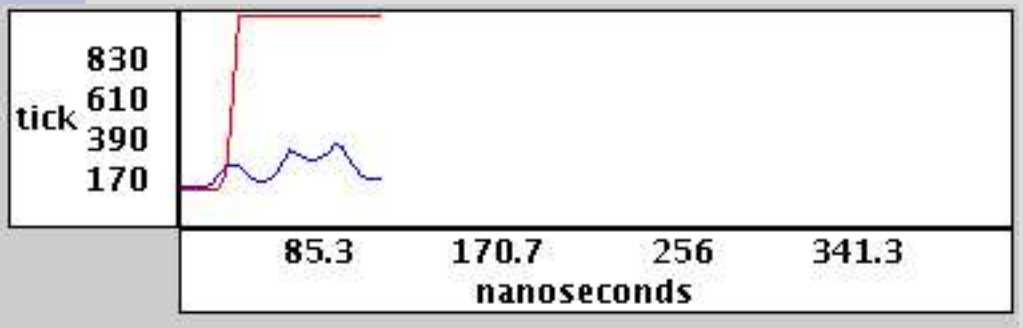


No ATWD Channel 1

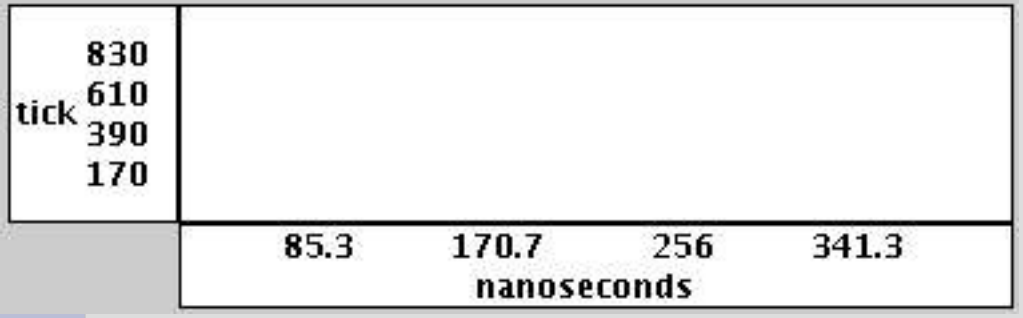
No ATWD Channel 2

Waveforms IV

Dom 48



ATWD Channel 0

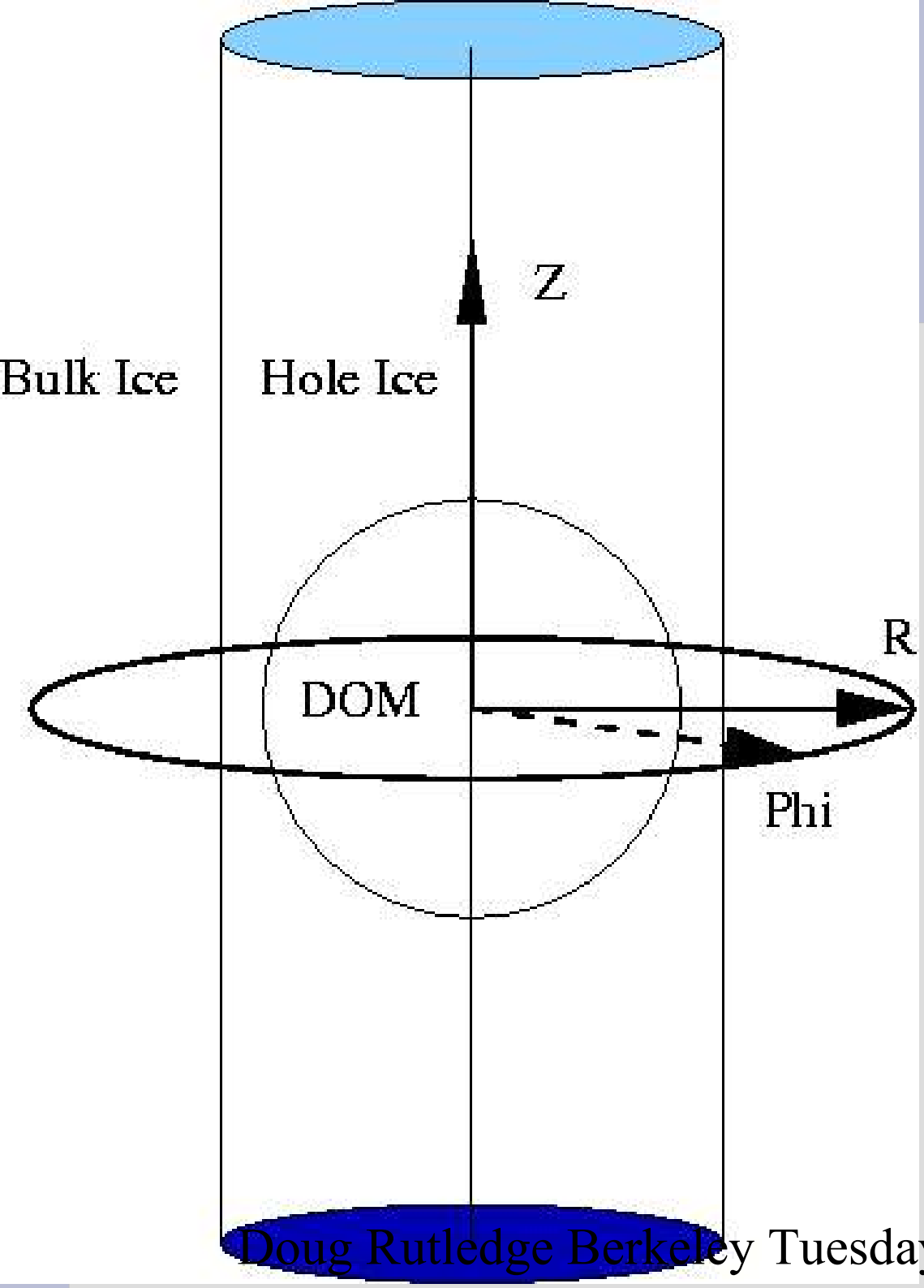


No ATWD Channel 1

No ATWD Channel 2

Dom 56

Photonics Studies I: Geometry



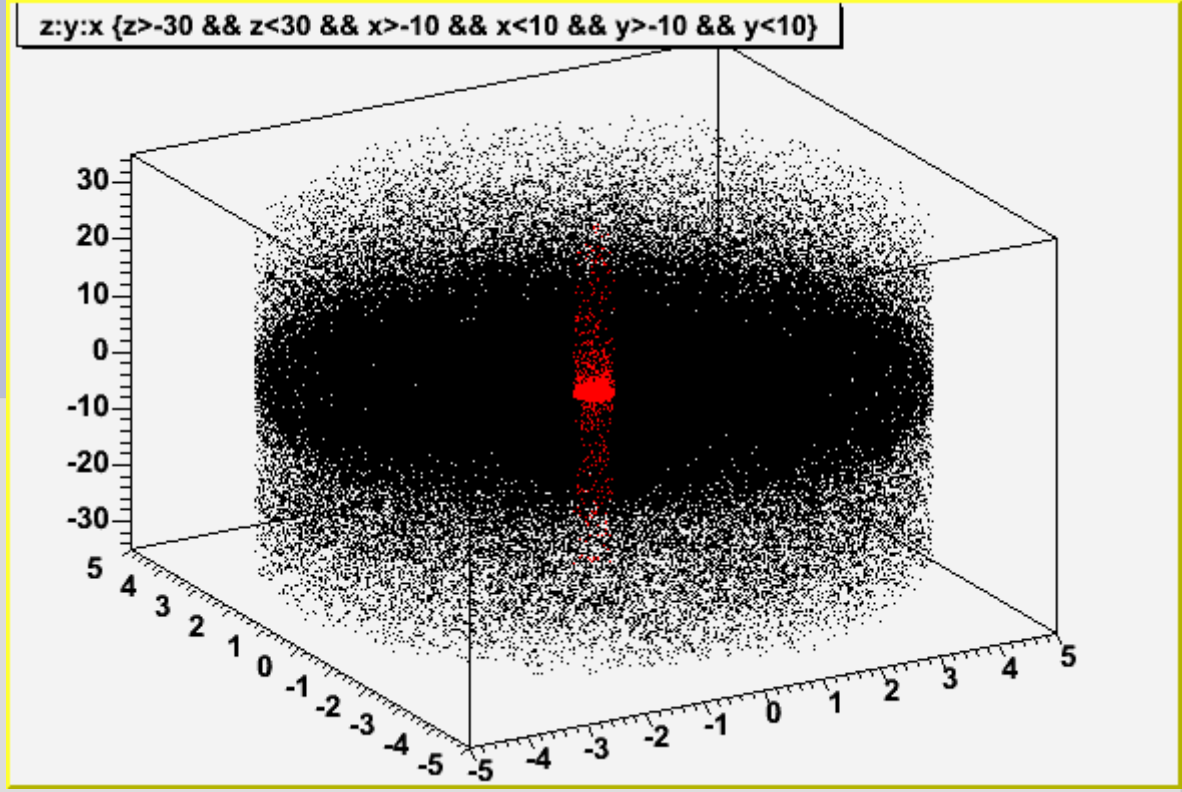
Michelangelo's Photonics Special features

hole radius: 0.3 m

flasher wavelength: 405 nm

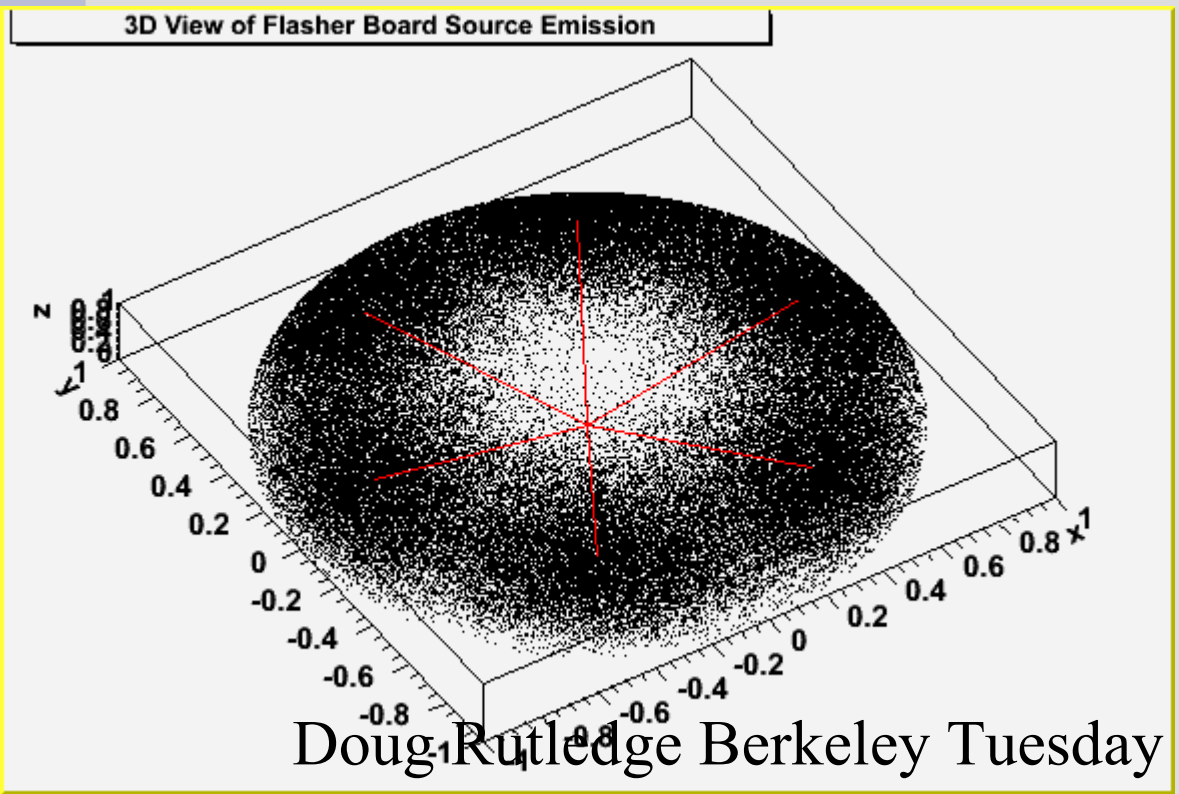
Hole Ice Scattering Length: variable

Photonics w/ Hole Ice



Scattering in & out of the hole

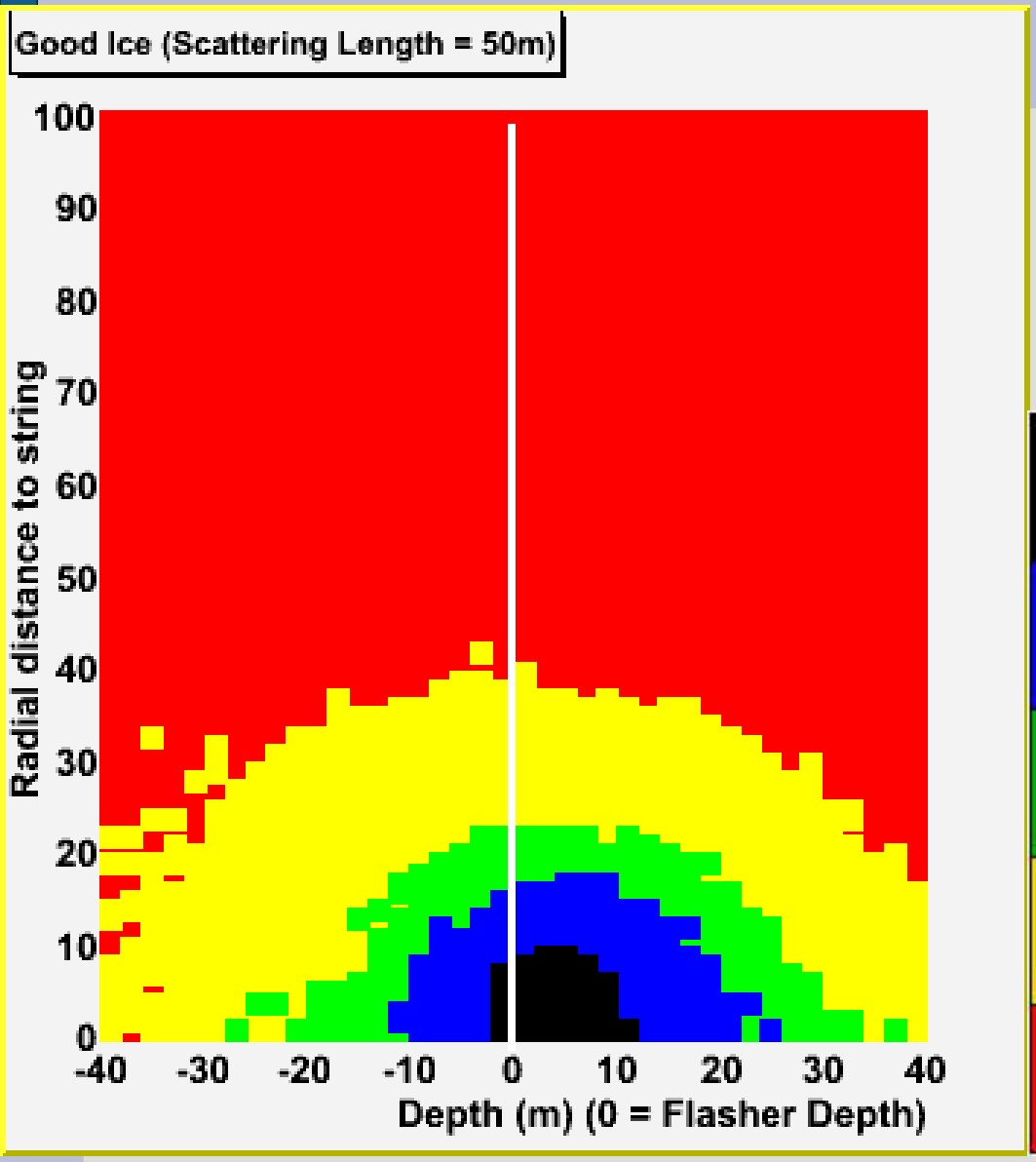
6 horizontal flashers



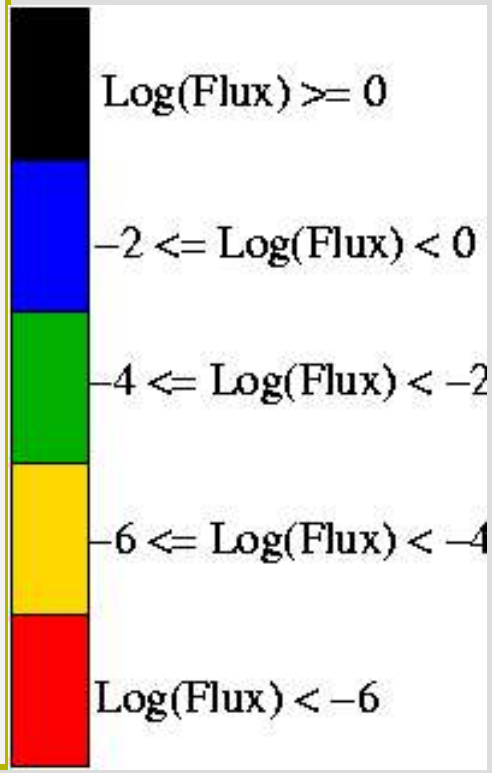
Plots courtesy of Michelangelo D'Agostino

http://amanda.berkeley.edu/~mdagost/photonics/

Photon Flux I: Hole Ice scattering length = 50m



Flux, in arbitrary units



Photon Flux II: Hole Ice scattering length = 1cm

Flux, in arbitrary units

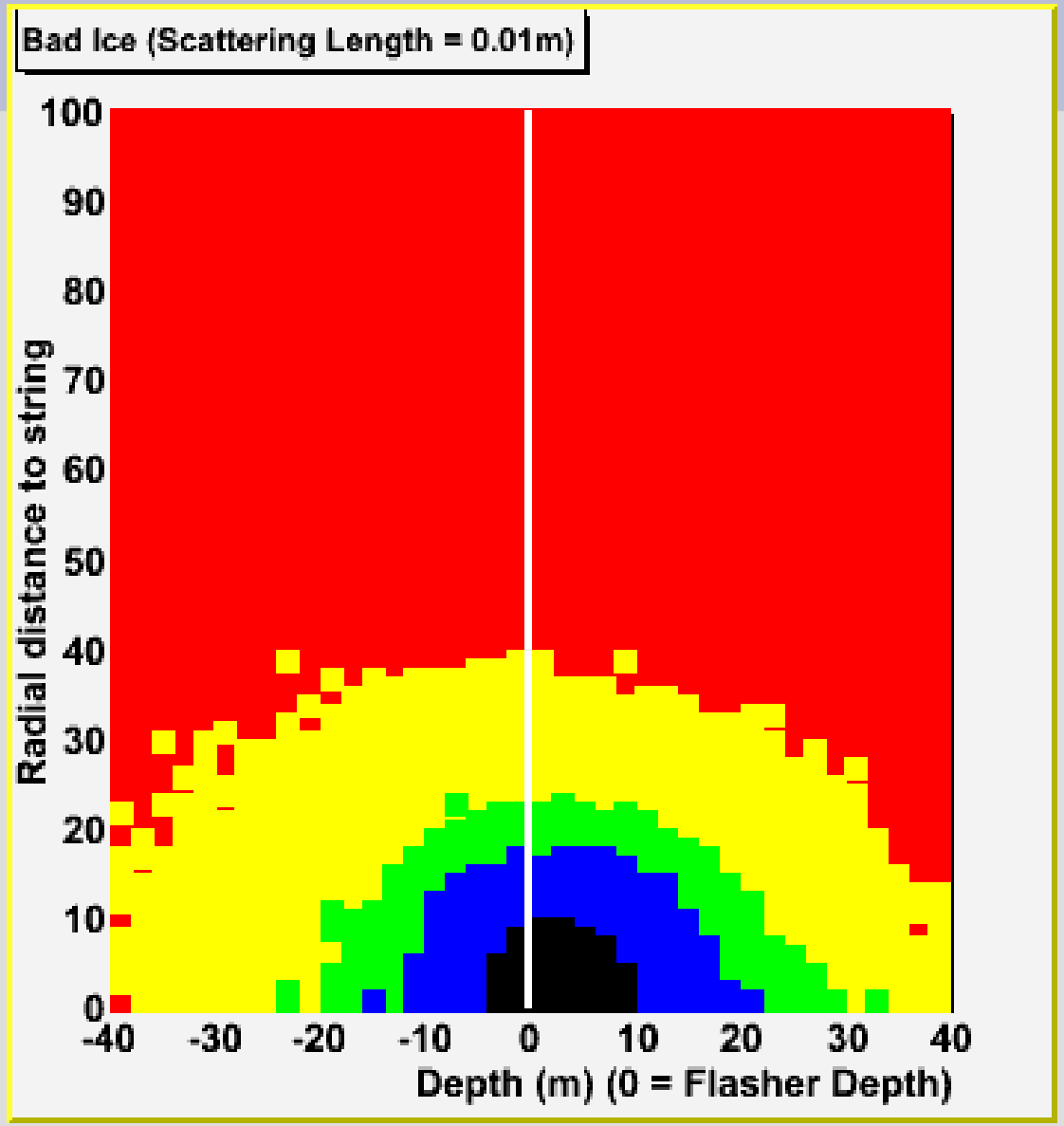
Log(Flux) >= 0

–2 <= Log(Flux) < 0

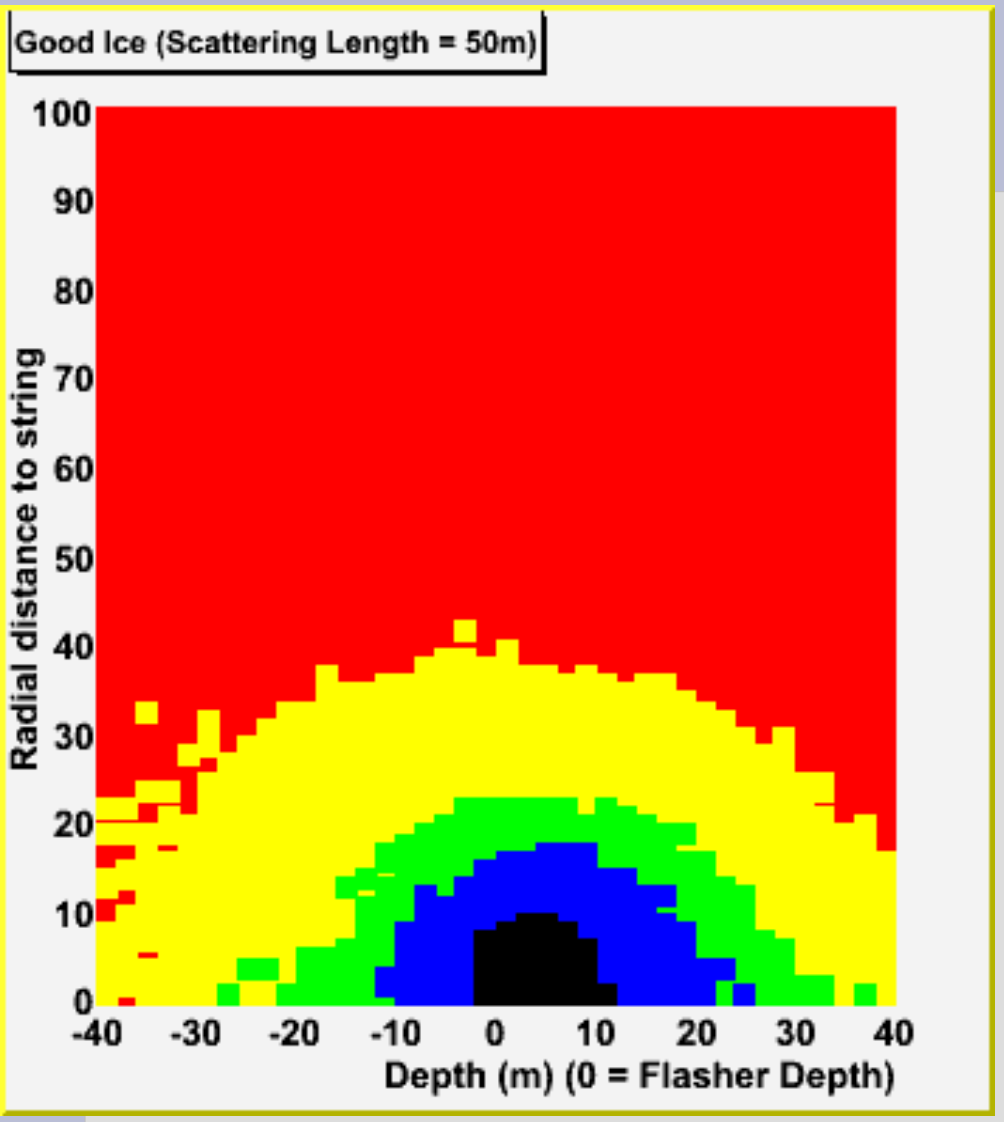
–4 <= Log(Flux) < –2

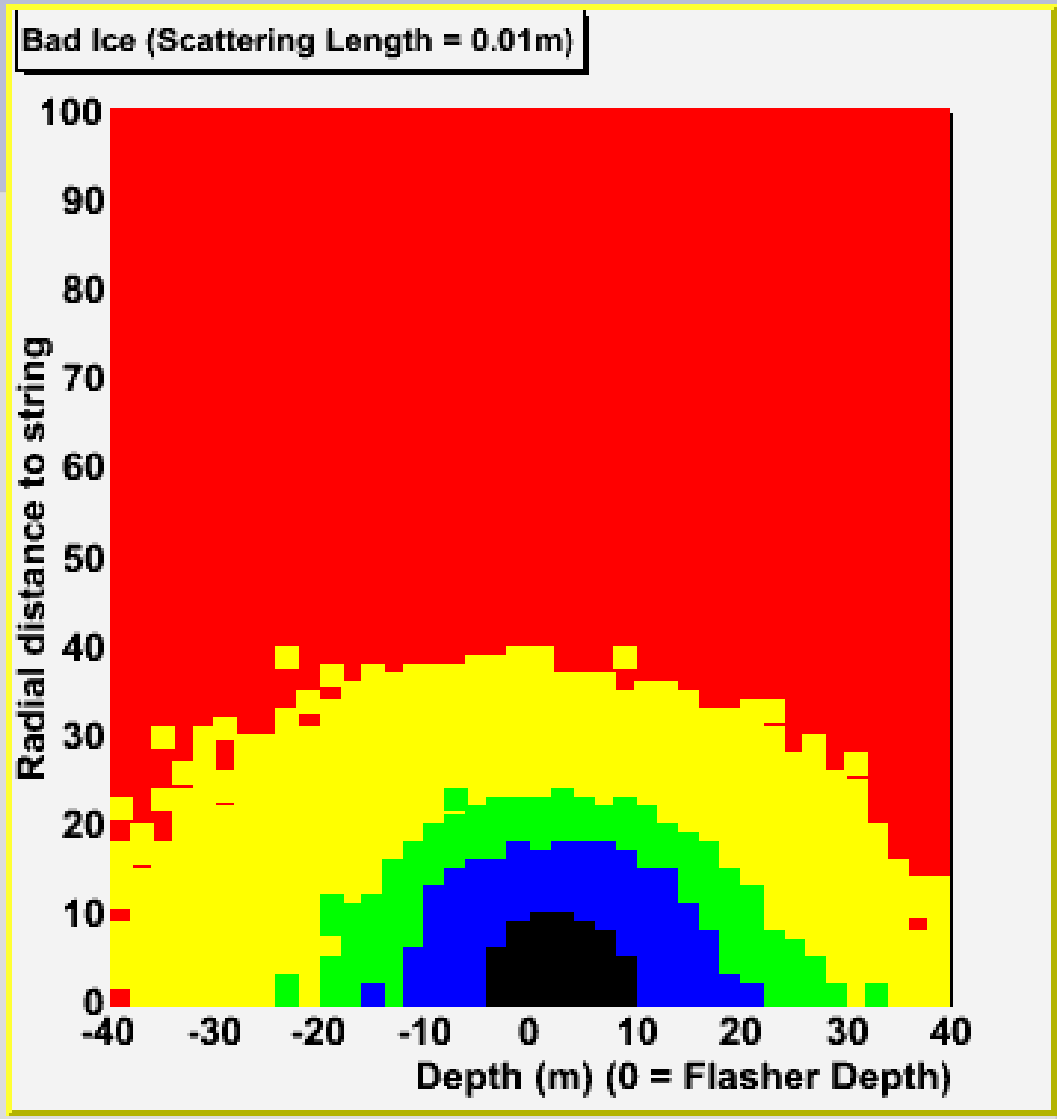
–6 <= Log(Flux) < –4

Log(Flux) < –6

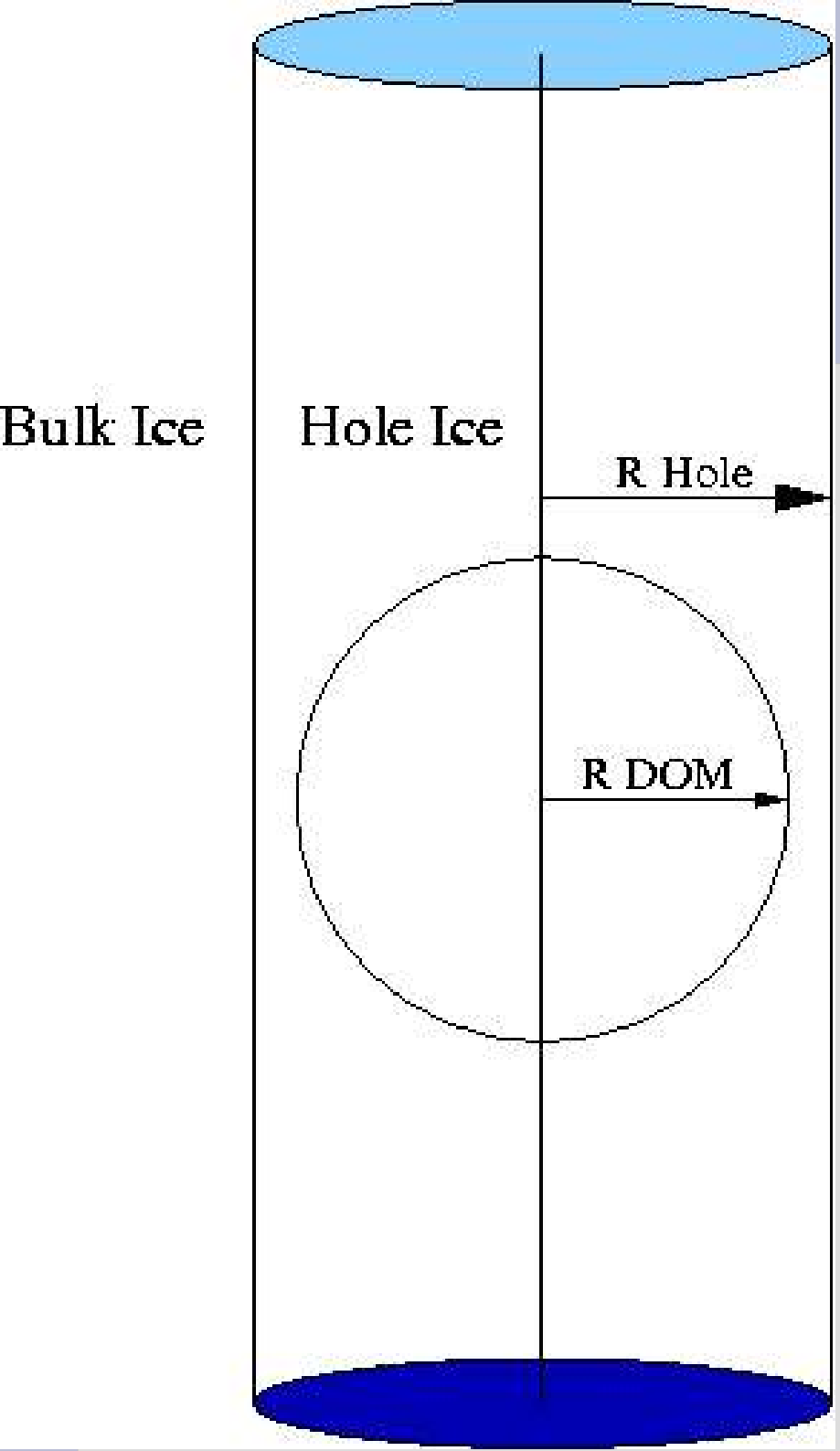


Photon Flux comparison



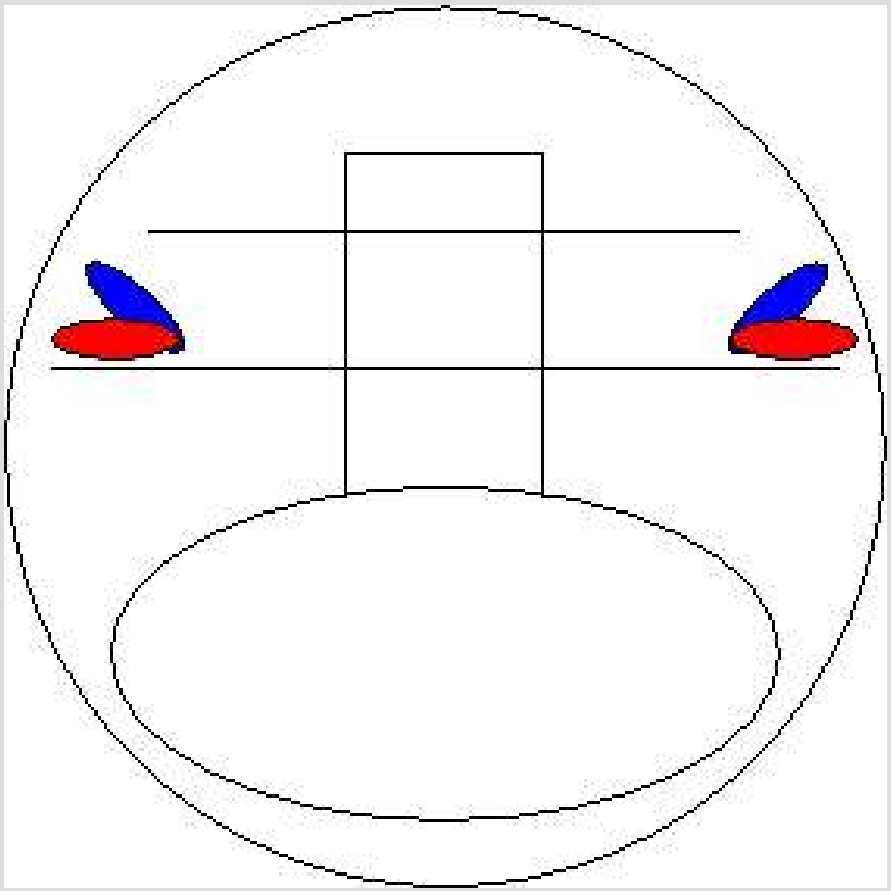


So why is there no difference?



- $R_{Hole} - R_{Dom} \approx 10$ cm
  - Few sacttering events in the hole

New Flasher data



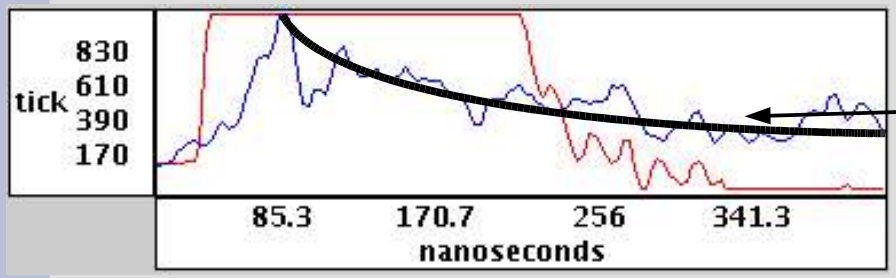
- Data w/ just horizontal flashers
- Data w/ just angled flashers
- Full ATWD Readout
- Wish List:
  - OM in the dust Layer
  - Full ATWD Readout
    - 128 Samples
    - All three channels
  - Flasher data for each DOM
  - A lot of these conditions are met with new data

Further Photonics Studies

- New Photonics tables
  - Only horizontal Leds
  - Only angled Leds
- Simulate out to other strings

Further Studies

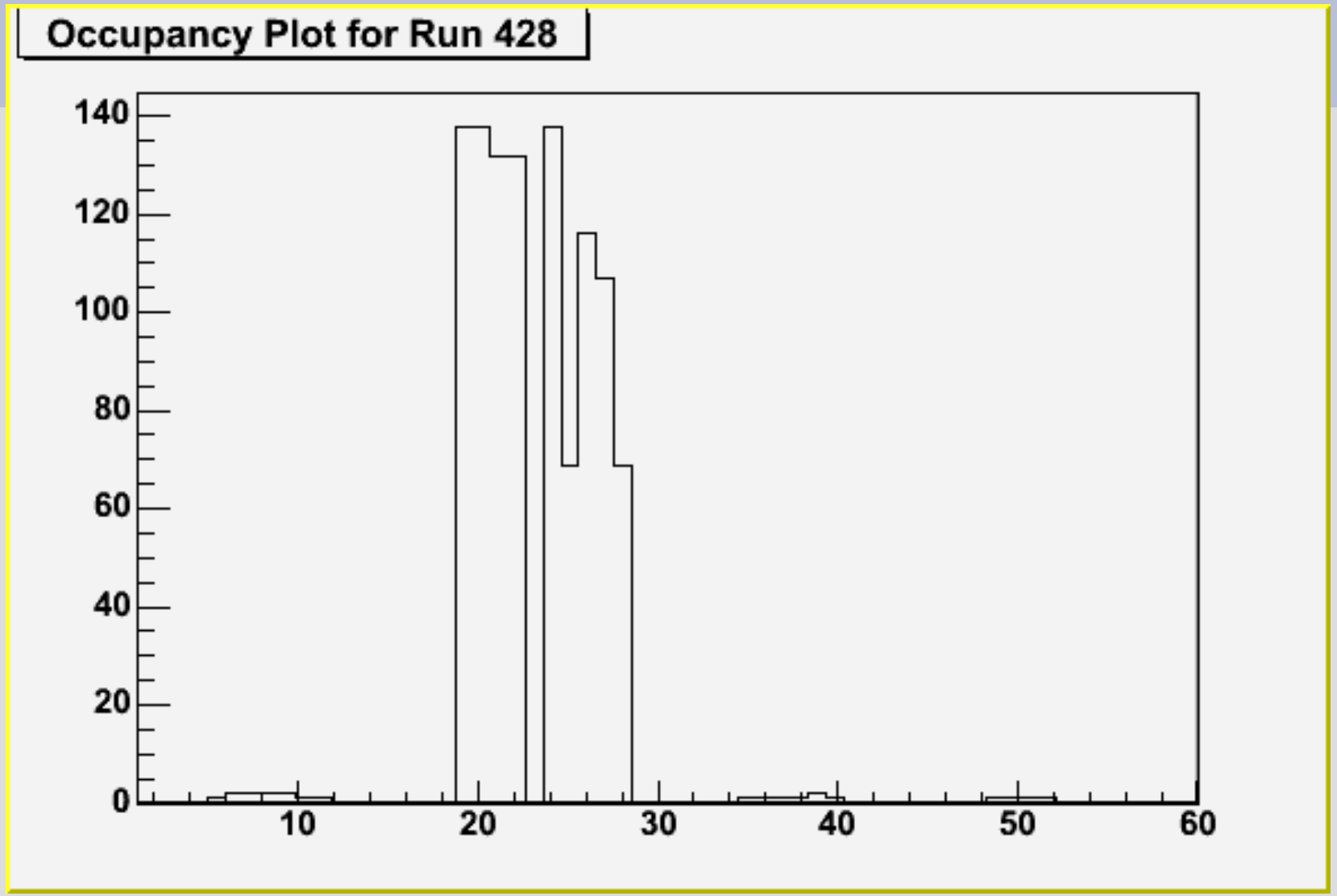
- Detect flashers with AMANDA?
  - Probably not
  - Try it with new strings? (next year)
- Waveform studies
  - Length of waveform tail
    - In Principle, depends on scattering length



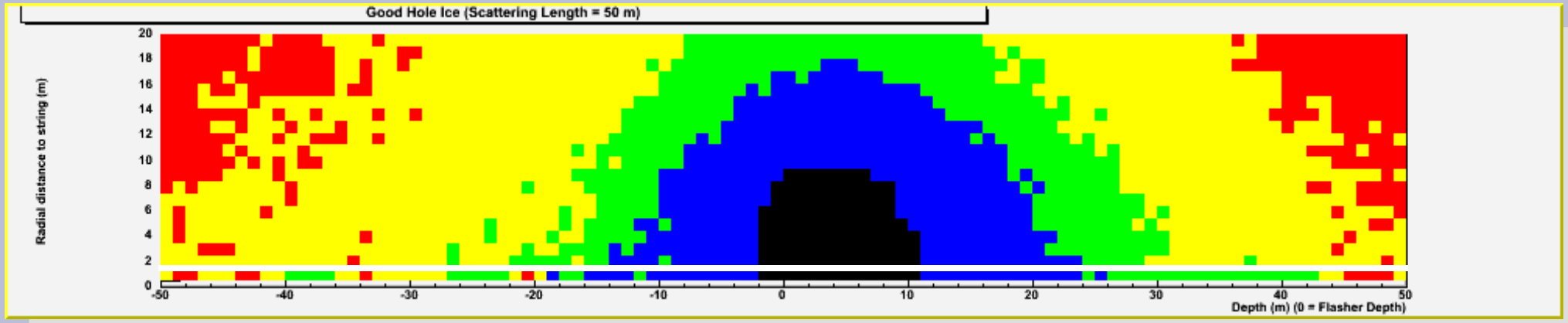
Conclusions

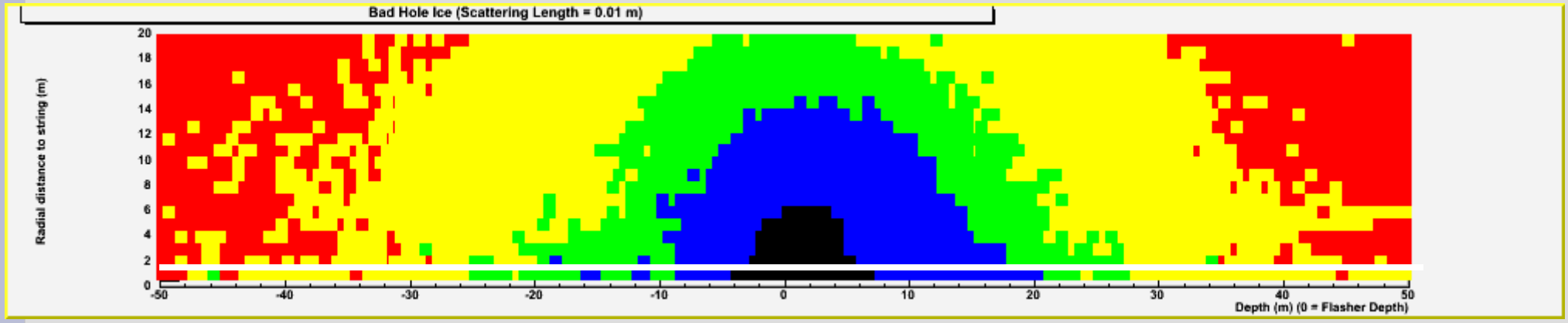
- Hole Ice scattering length has little effect
  - Detector is insensitive to dramatic changes
- Up/Down asymmetry
  - New flasher data
    - Test the effects of angled vs horizontal LEDs
    - Make Q Vs D plots
      - Use channel switching
      - More participating Doms

This is why it is called a “mini-string”

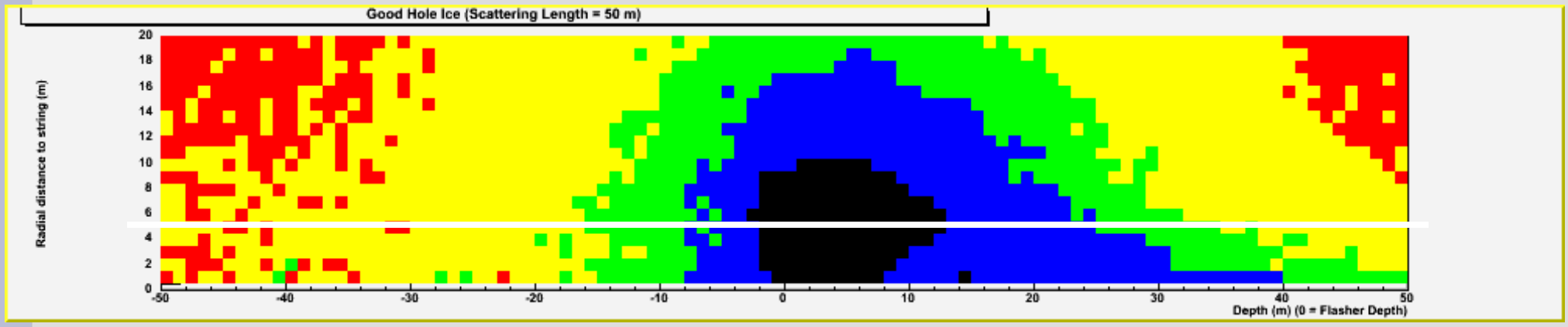


Hole size studies I: Hole Radius = 1.5m

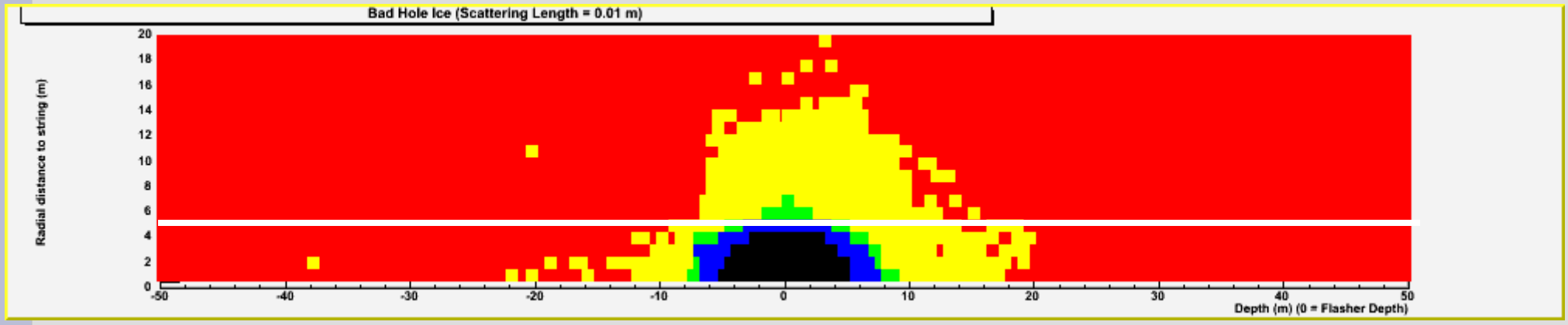




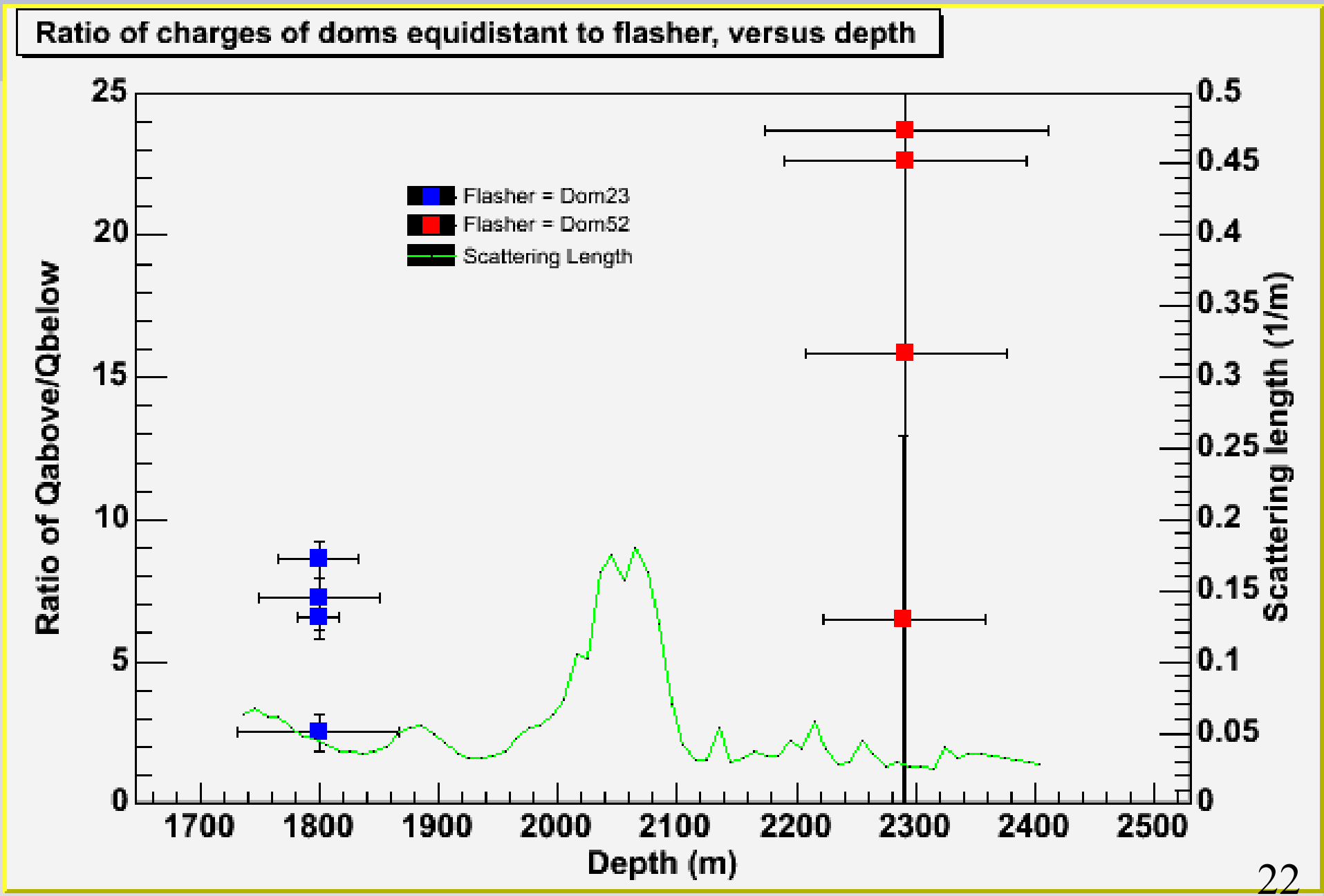
Hole size studies II: Hole radius = 5.0m

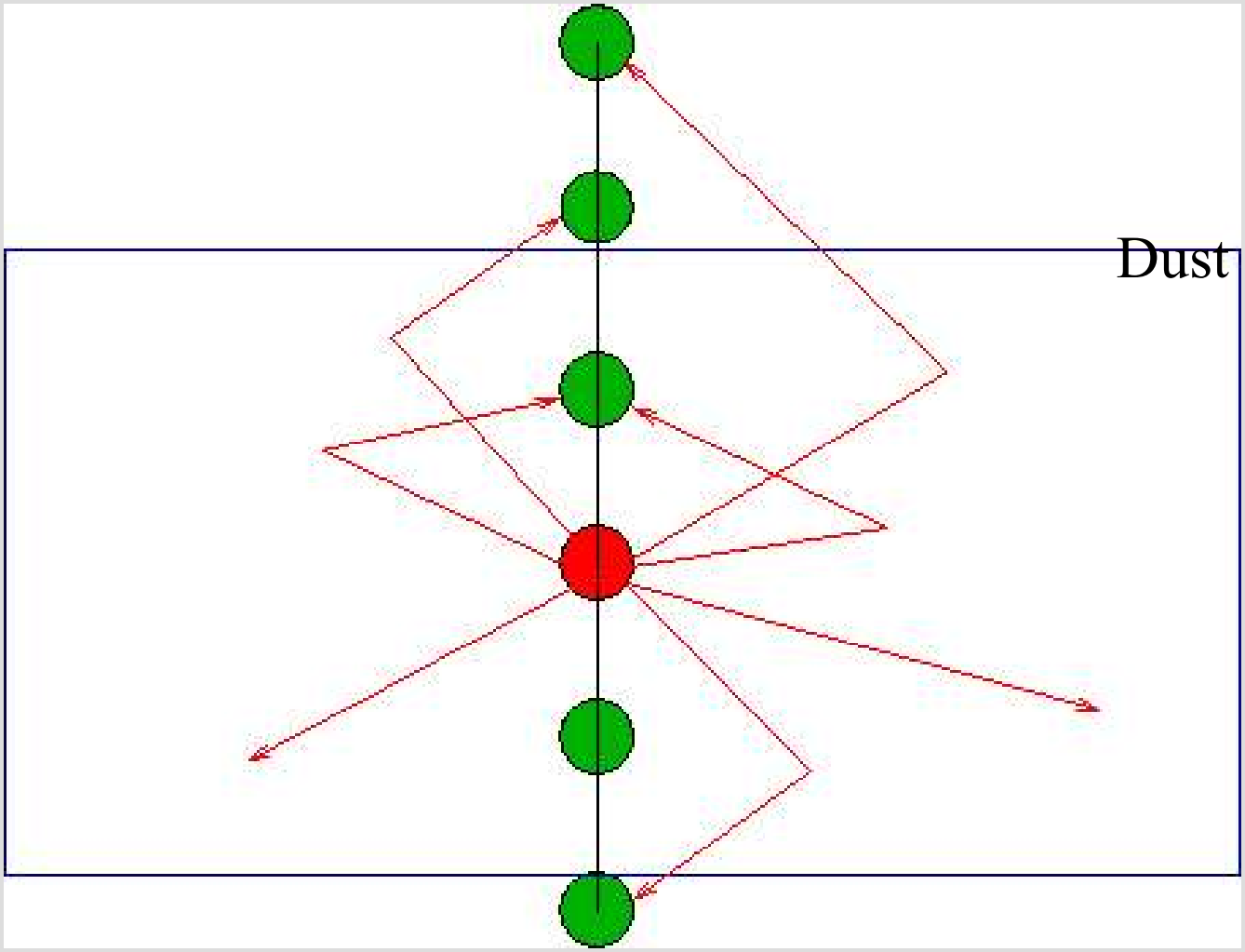


Big Difference!



Ratio of Q_{above} to Q_{below}




Dust Layer