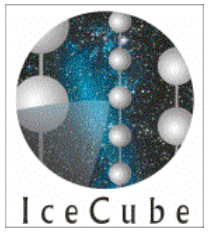
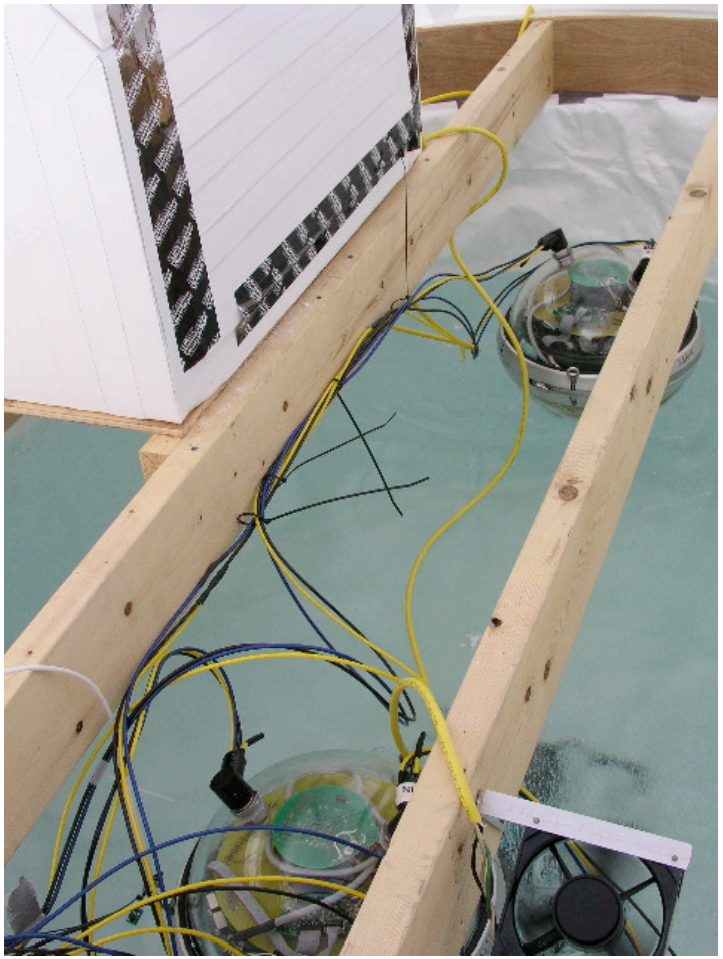


IceTop:
A First Look at the Data

John Kelley

February 25, 2004

Overview



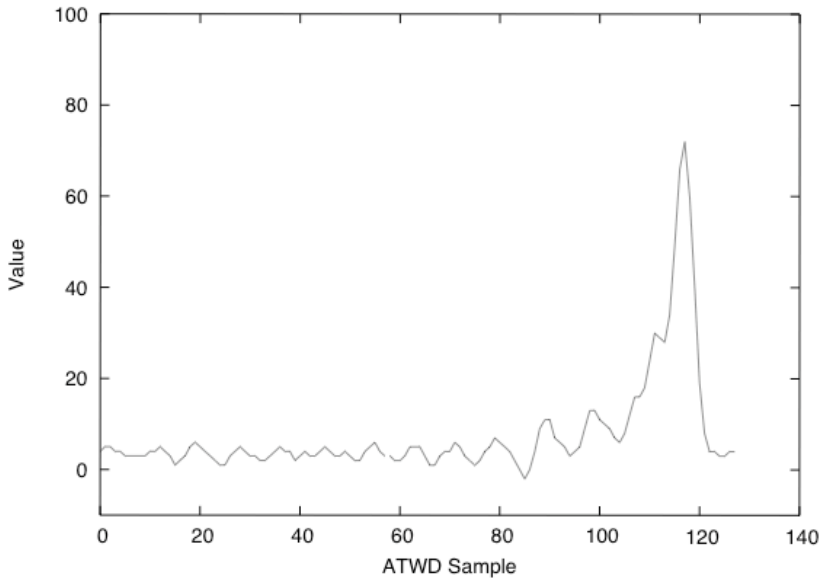
- Four DOMs currently deployed at pole, frozen into two IceTop surface tanks
- Tanks are now closed and dark-adapted

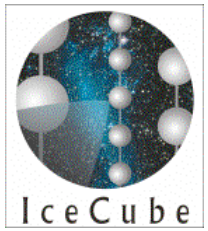
IceTop DAQ Hardware

- DAQ located in SPASE shack
- Components:
  - "Pirate" DOMHub
  - Power supply for DOMs
  - GPS clock distribution box

IceTop DAQ Software

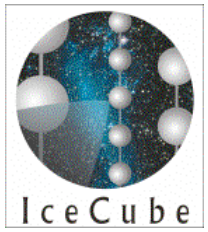
- Python-based acquisition program
  - GPS synchronization
  - Regular RapCal time calibration
  - Continuous data acquisition
  - Can acquire up to 130 Hz (2.2 kHz burst, limited by data transfer to DAQ)
  - Run in parallel for each DOM





GPS Synchronization

- SPASE TrueTime GPS signals distributed through K. Sulanke's clock distribution box
- 10 MHz output drives internal DOR card oscillators
- UTC time string is loaded into DOR card, converted into DOR oscillator count
- RapCal DOM-to-DOR mapping can now be used to convert DOM timestamps to UTC (+/- 50ns)

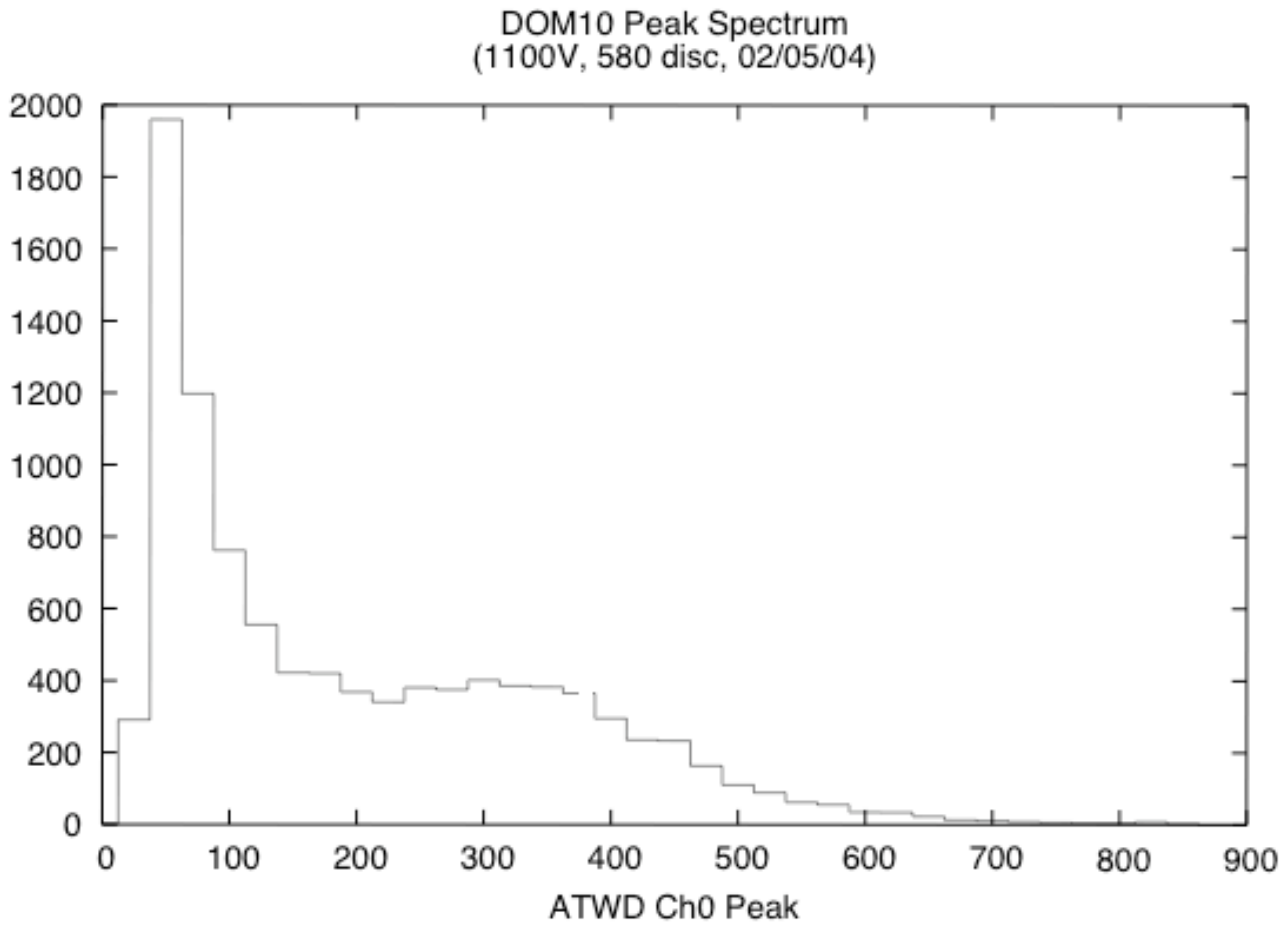


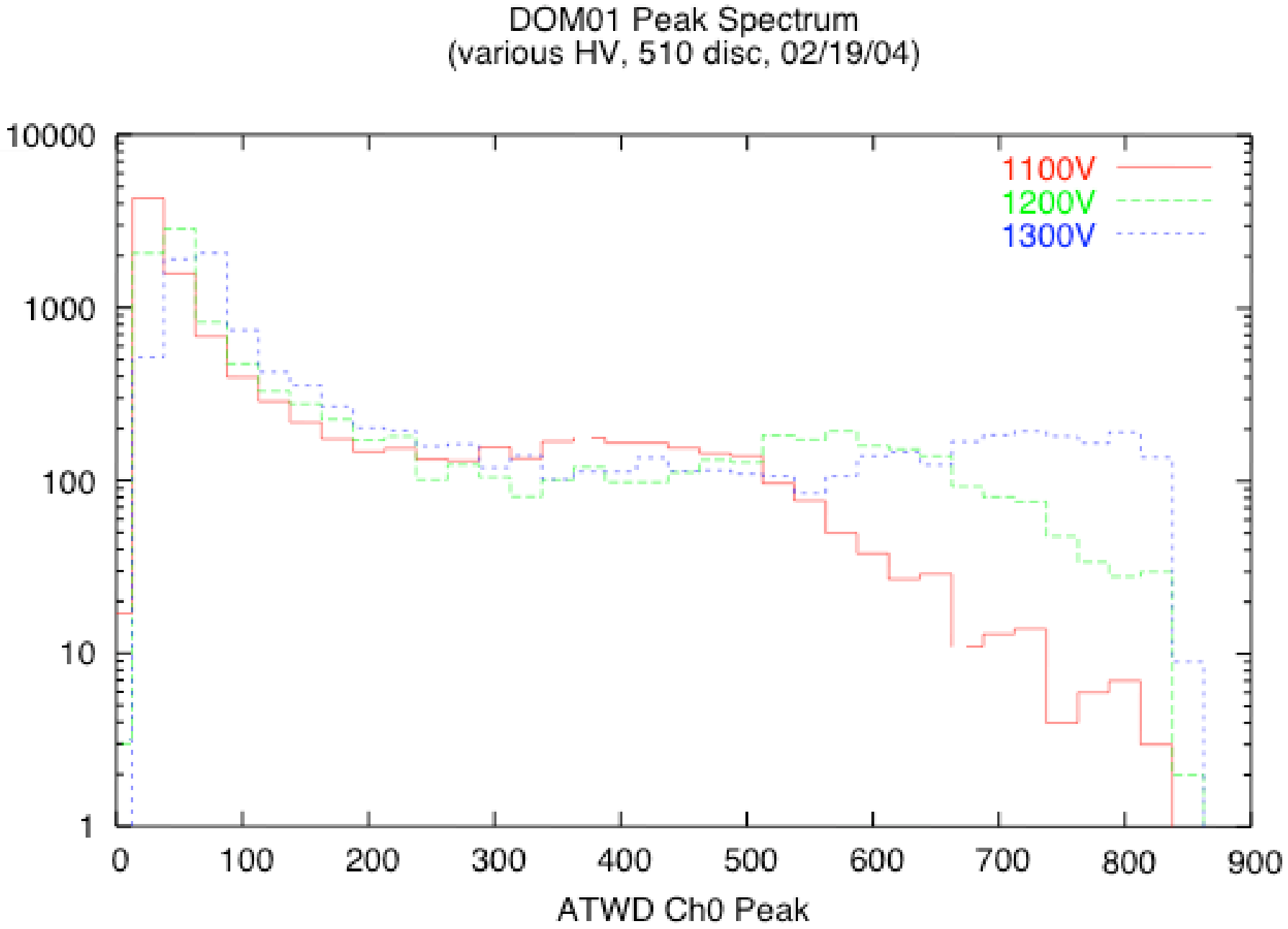
Temperature and Rates

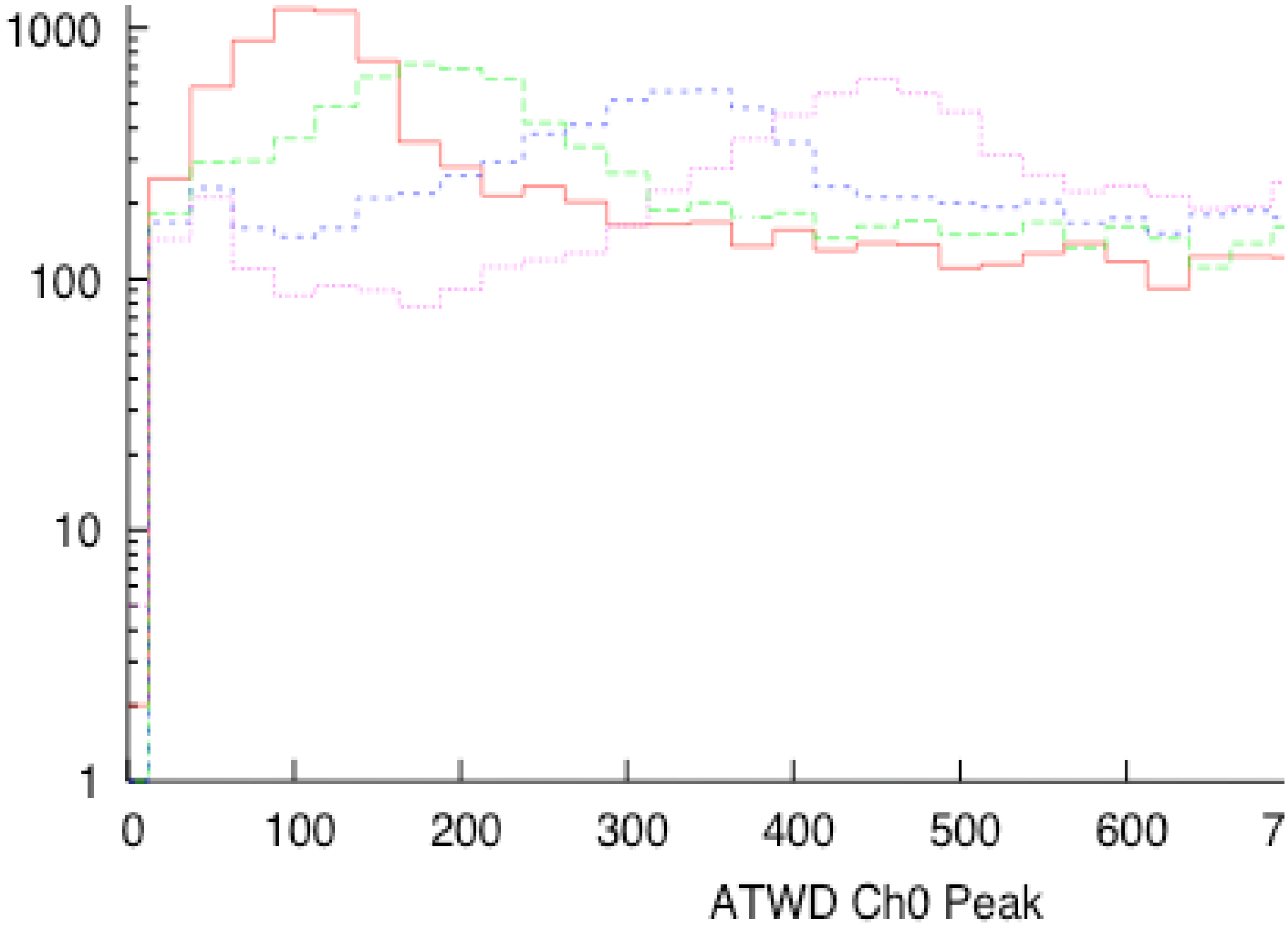
DOM	Temp. 2/9/04	Rate	Temp. 2/24/04	Rate
Frankendom	-2.9 ºC	17 kHz	-11.8 ºC	12.2 kHz
Chip	-3.5 ºC	20 kHz	-12.6 ºC	16.1 kHz
Bubble	4.1 ºC	23 kHz	0.5 ºC	19.7 kHz
Scarface	4.8 ºC	26 kHz	0.5 ºC	23.1 kHz

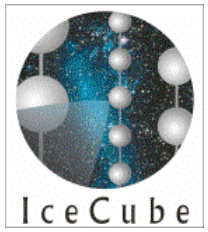
Trigger rate taken at nominal HV, about 1/3 PE discriminator

Peak Spectrum



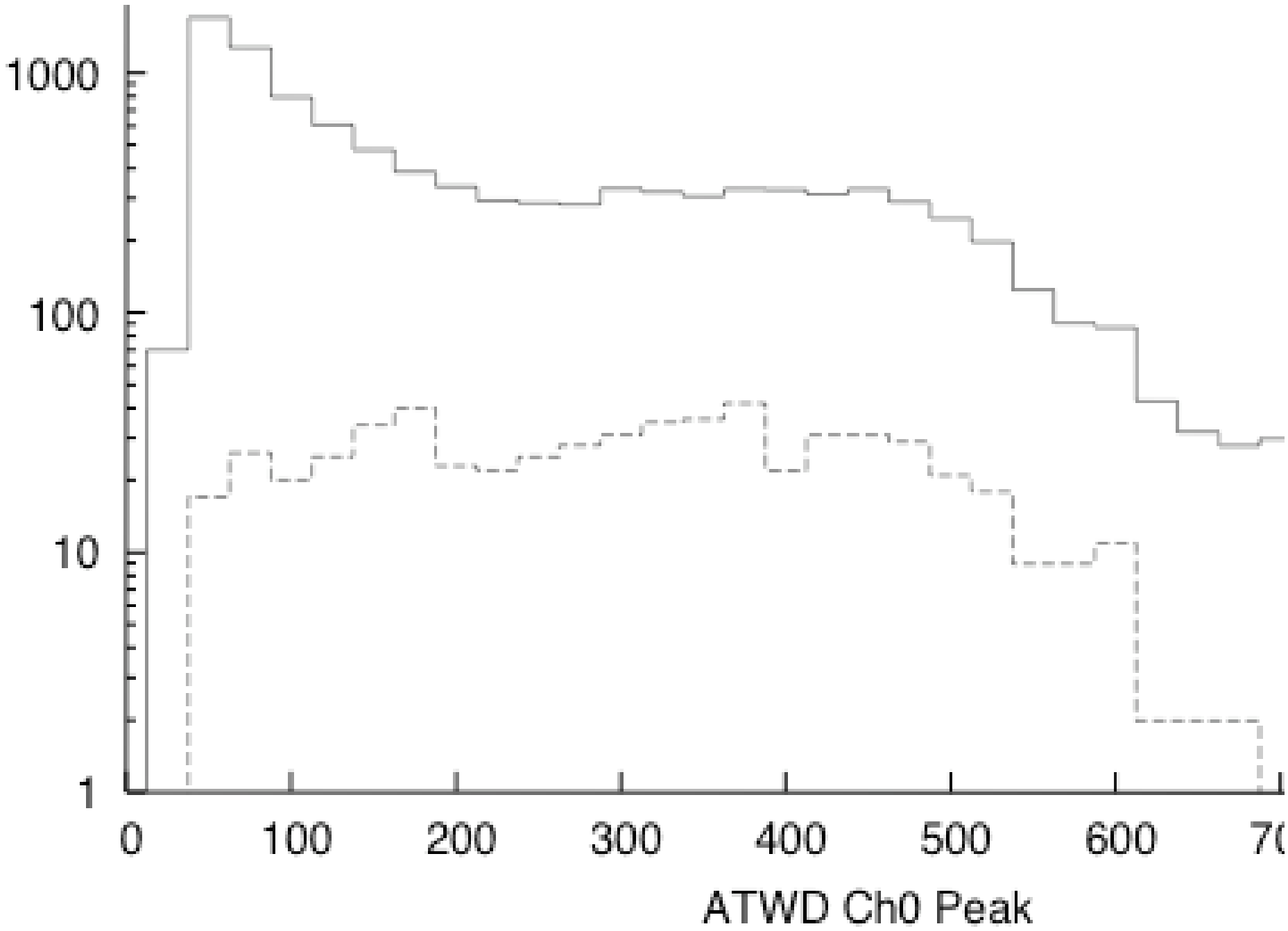

DOM01 Peak Spectrum
(various HV, 510 disc, 02/19/04)
10000
1000
100
10
1
0
100
200
300
400
500
600
700
800
900
ATWD Ch0 Peak
1100V
1200V
1300V


1000
100
10
1
0
100
200
300
400
500
600
7
ATWD Ch0 Peak

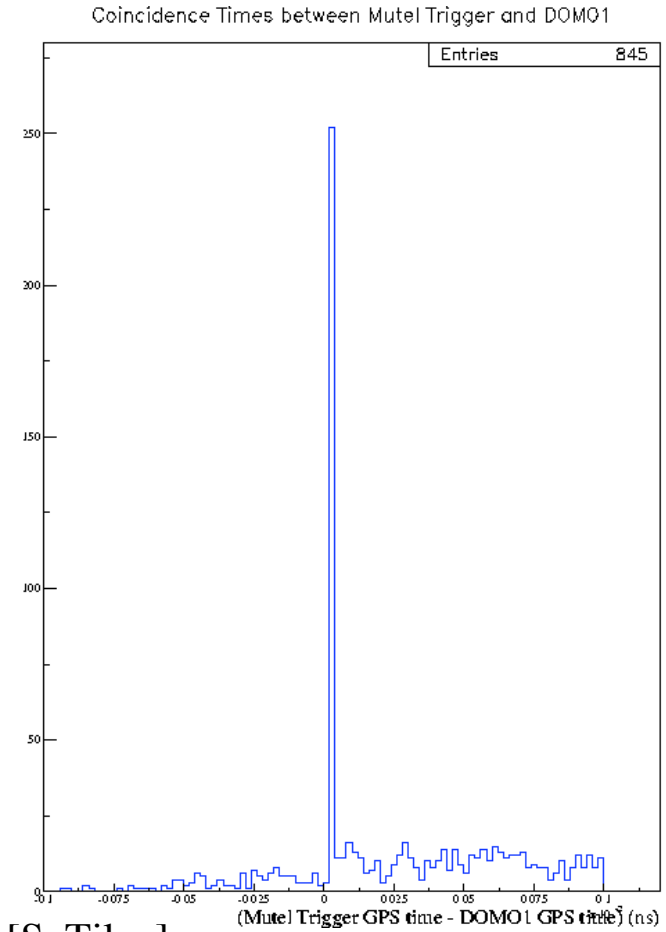


Coincidence

- Hit coincidence is determined offline (Perl script!)
- For fast processing of sparse hits, create 1 μs hash entries for each DOM's hit times
  - @hits{dom}{utc_us} = (t_hit1, t_hit2, …)
- Then just need to check for hash-entry existence and deltaT on a small number of hits -- current window is 200 ns

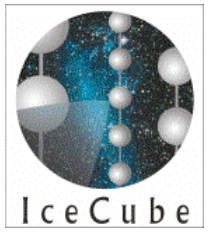

1000
100
10
1
0
100
200
300
400
500
600
ATWD Ch0 Peak

Muon Telescope Run

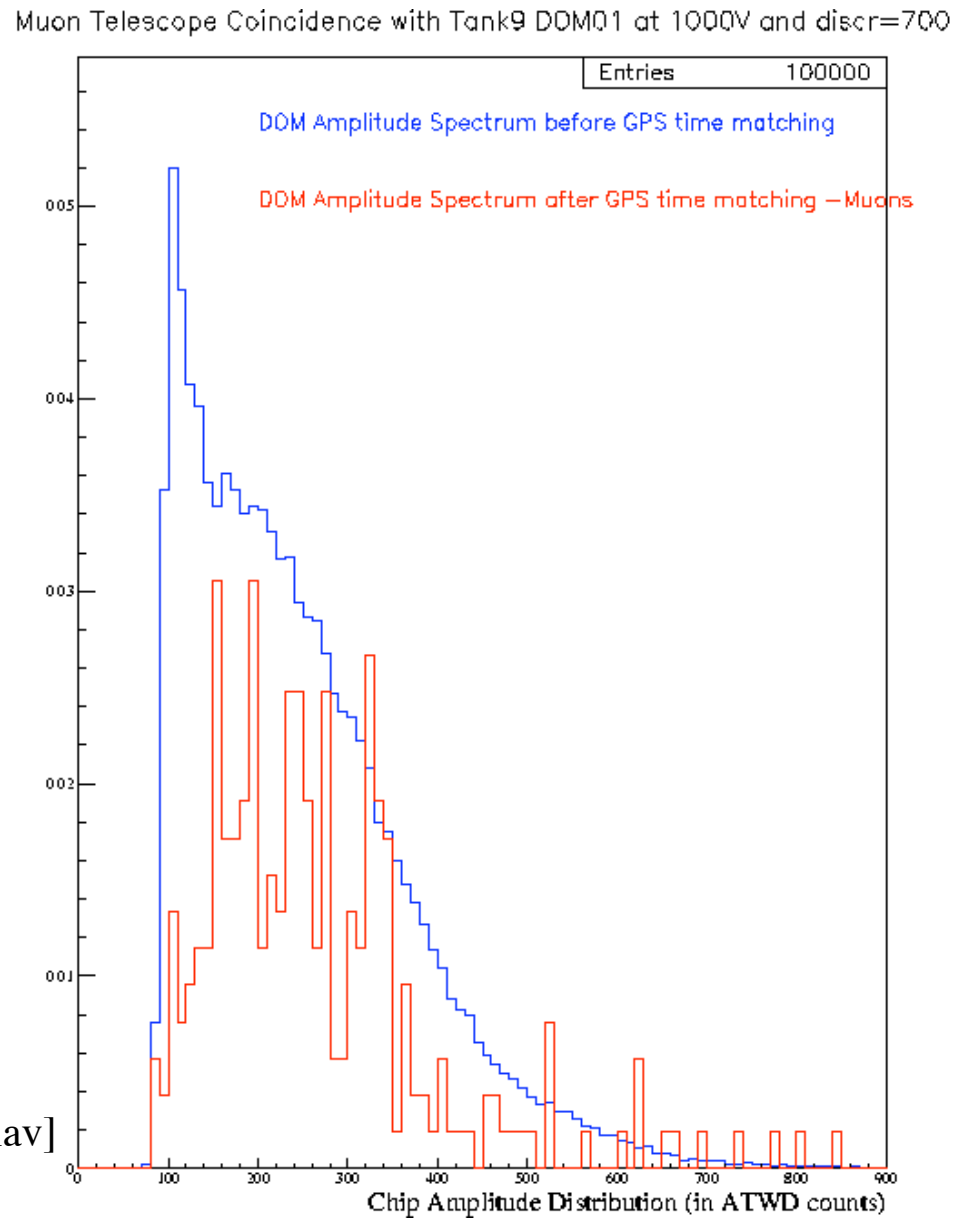


[S. Tilav]

- Serap Tilav took data from a time-calibrated muon telescope on top of Tank09
- Coincidence spike with DOM01 is at +36ns



- Coincidence suggests broad channel0 peak at reduced HV is from muons



[S. Tilav]