



## TOFP Project Status

W.J. Llope for the STAR-TOFP Group

*STAR Collaboration Mtg*

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# TOFp Systems Hardware

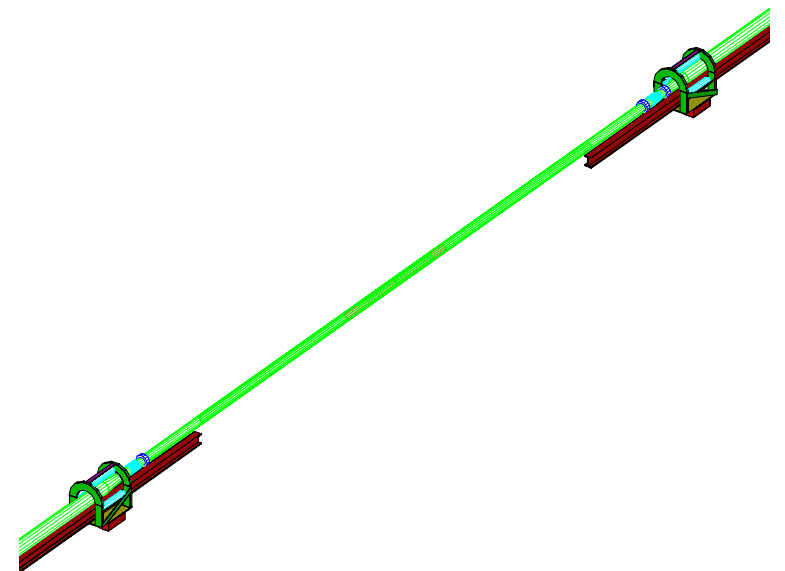
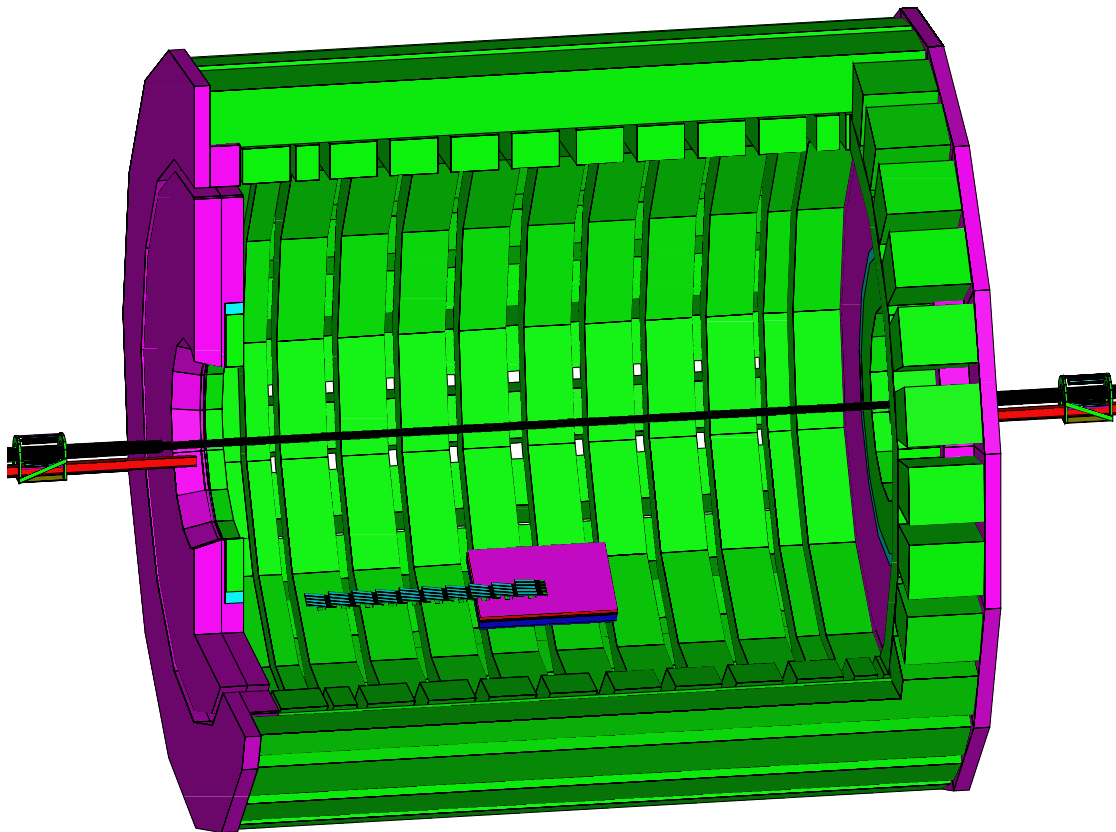
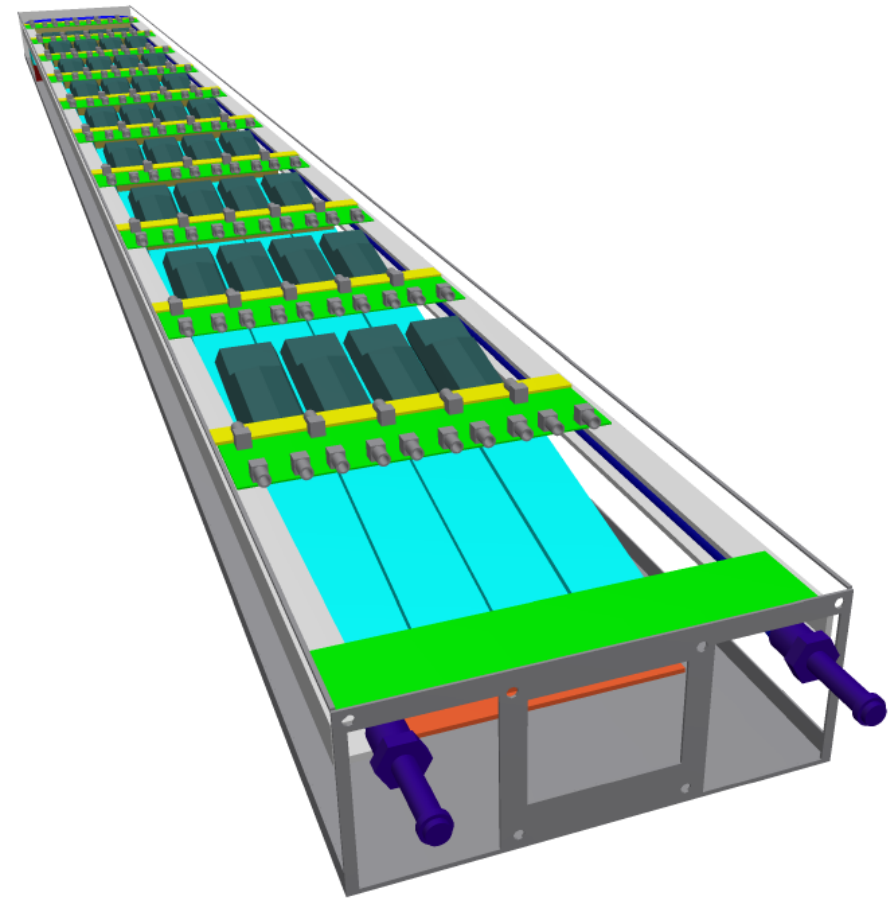
## the TOFp Tray

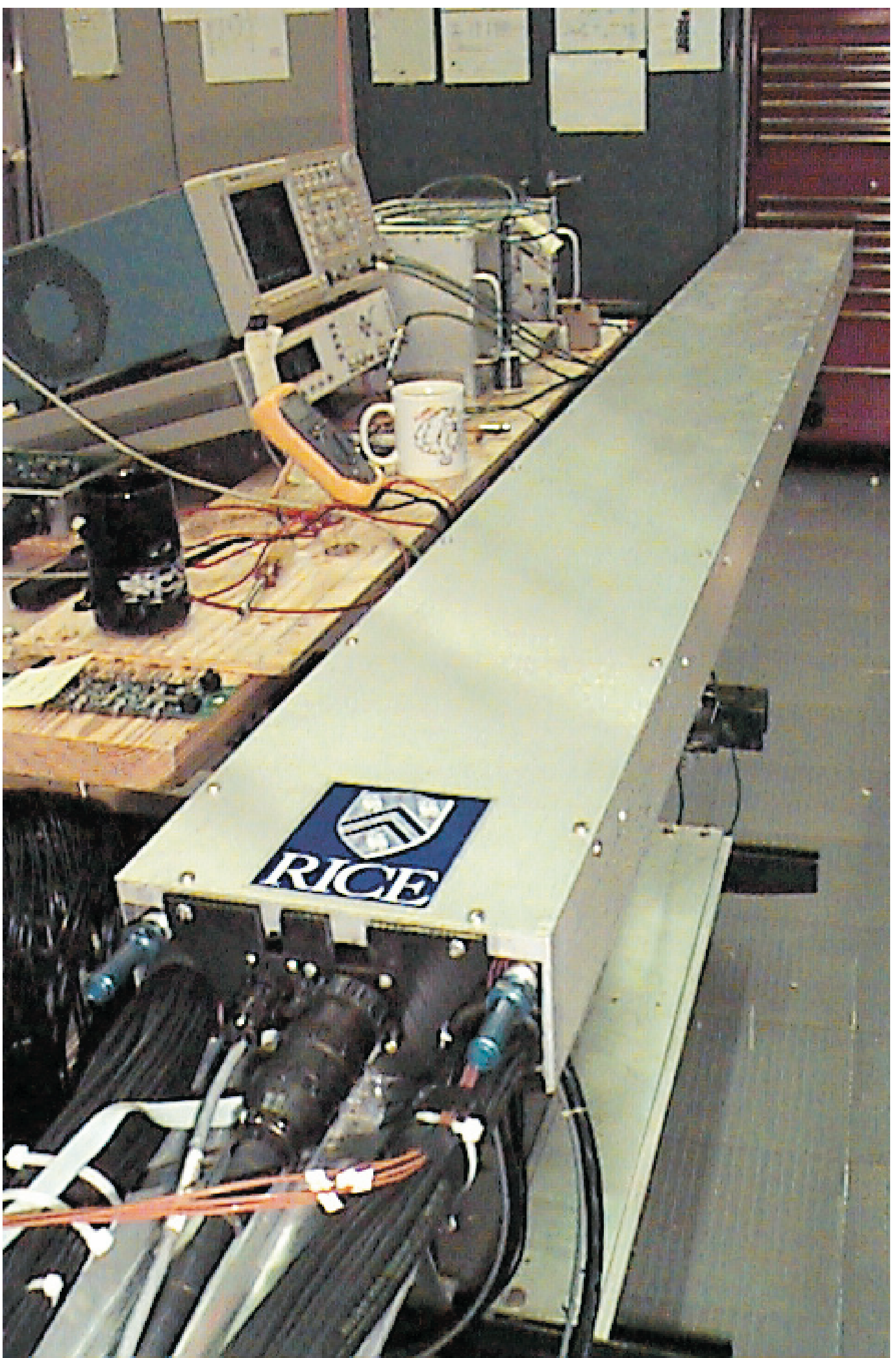
BC420+R5946+CW base  
~1 unit of rapidity, 1/60th of azimuth  
onboard high-performance FEE  
heat removal via water flow

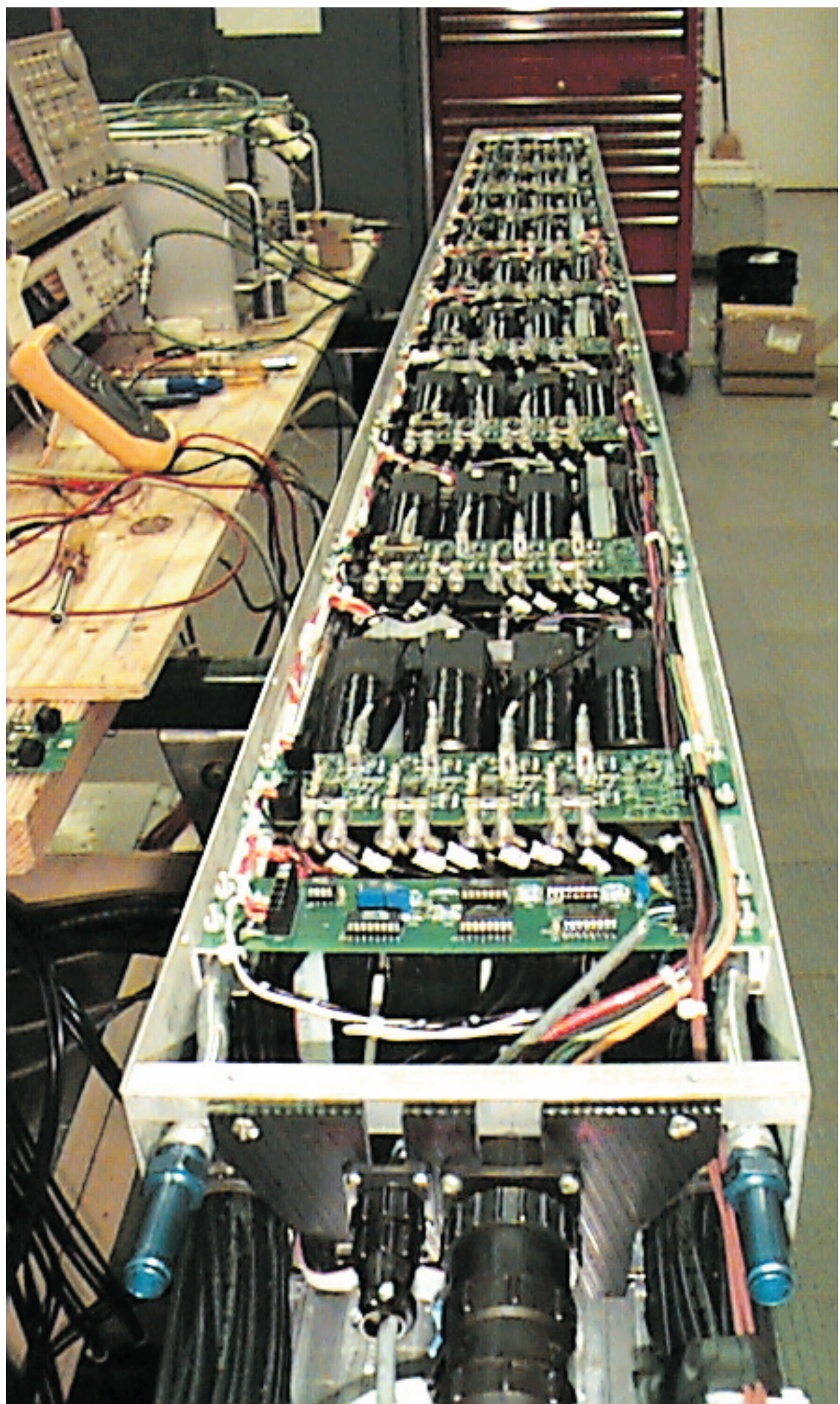
## the pVPDs (2 identical 3ch detector assy's)

Shielded Pb+BC422+R2083+linear base  
mounted on pipe support at  $|Z| \sim 4.2\text{m}$   
same high performance FEE as in tray

common digitization in CAMAC, Rack 1B2  
on-detector and cable path temperature monitoring  
ground loop measurement and monitoring  
all process and system control under linux







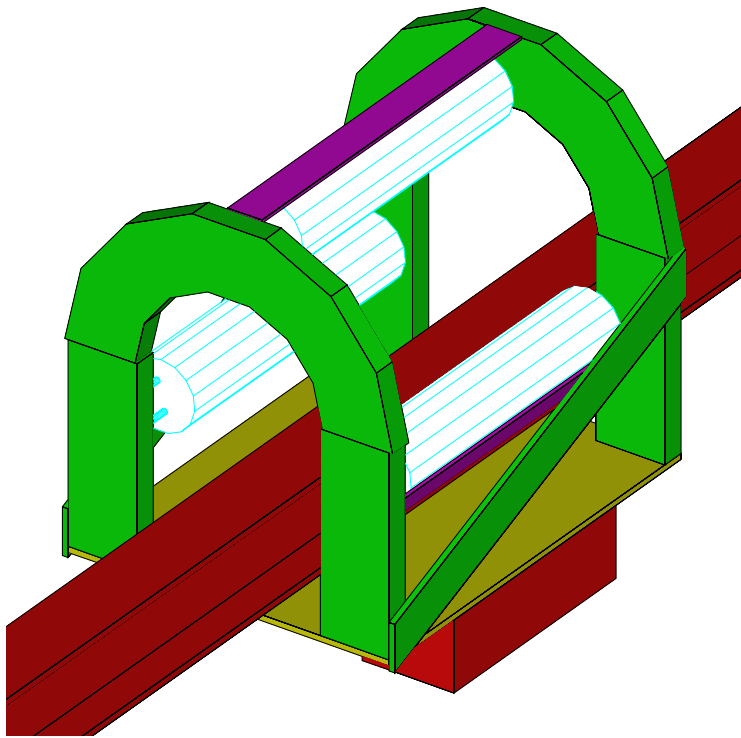
# The PseudoVertex Position Detector (pVPD)

need high-resolution starts for TOFp!  
primary vertices?  
centrality?

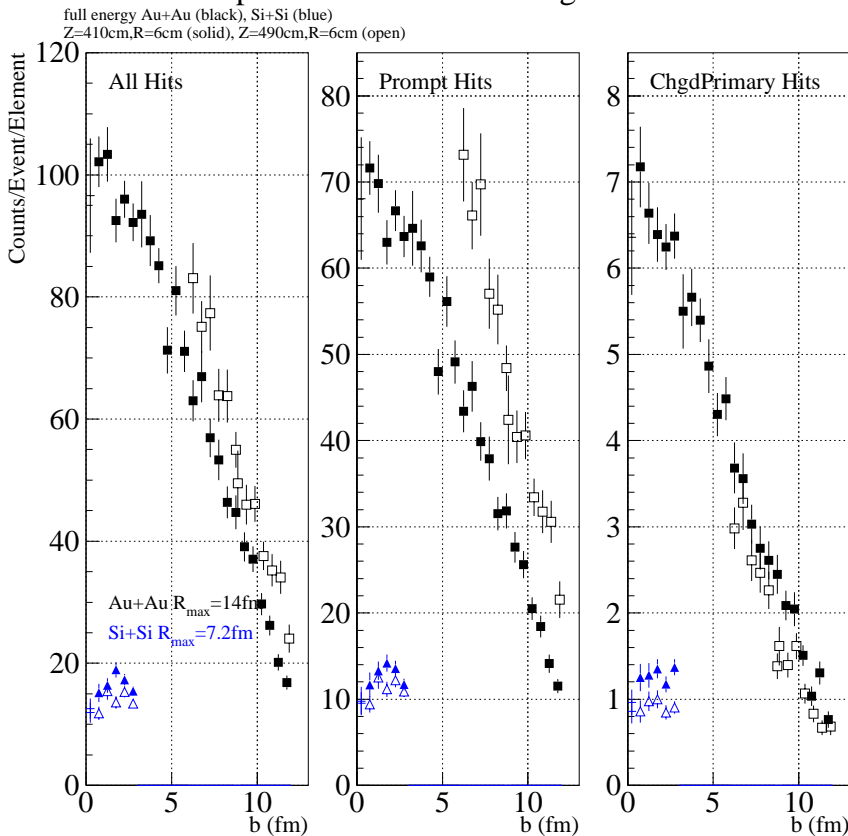
STAR approved  
BNL Safety approved

Construction:  
3 PMT chs/side,  $|Z| \sim 4.2\text{m}$   
FEE & digitization in TOFp systems  
pVPD data archived in TOFp Banks  
vertex position at Level-3  
Mechanical structure fab/test at Rice  
Shielded PMT fab at NASA-GSFC

can digitize ZDC times too...



pVPD in VENUS 4.12+gstar



SN 416

3 ch/side A.O.K. in all Au+Au  
...also works in most Si+Si

Positioning  $|Z| \sim 4.5\text{m} \dots (\Delta t \sim 14\text{ns})$

similar R2083-based Start  
Detectors at the AGS:

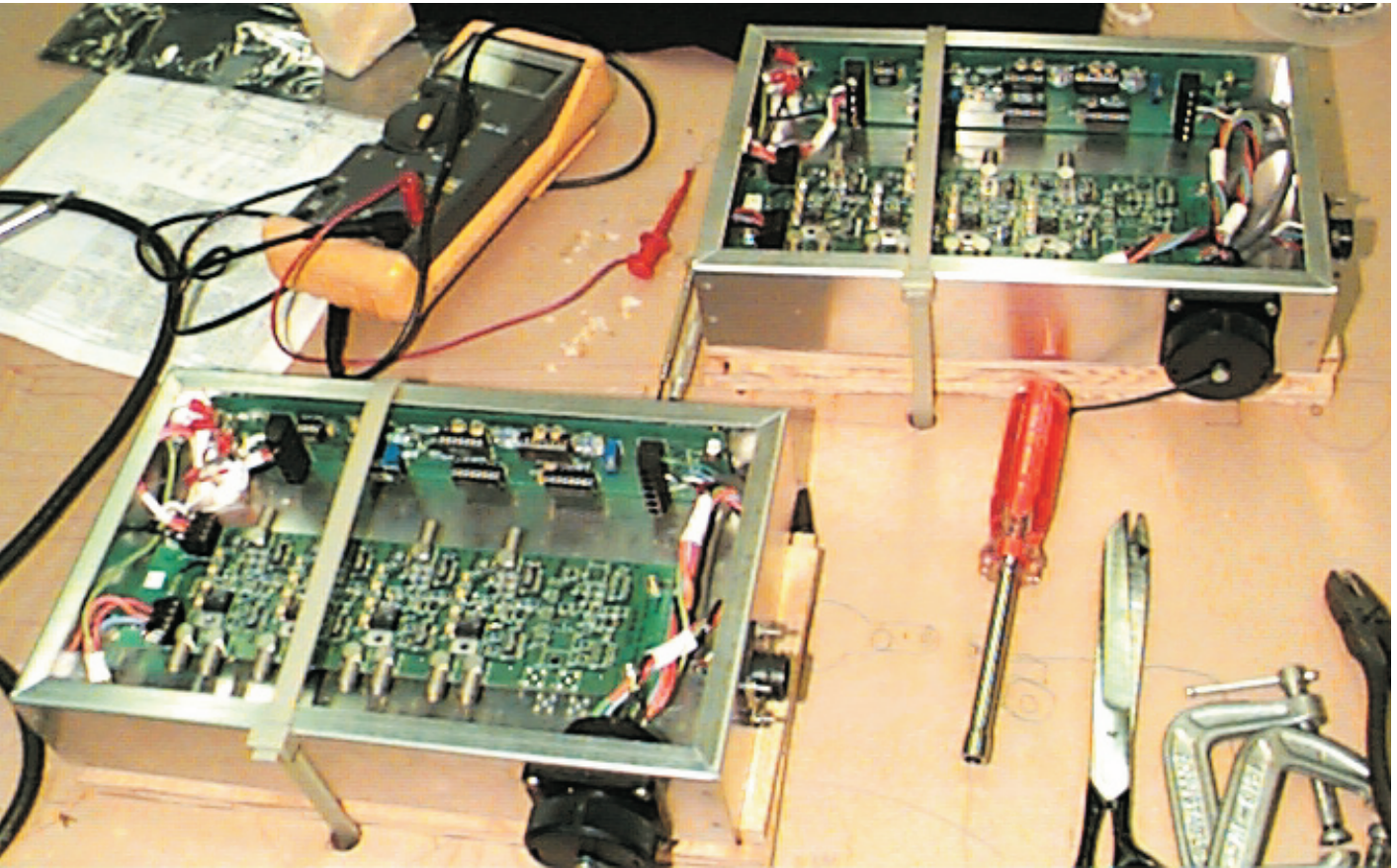
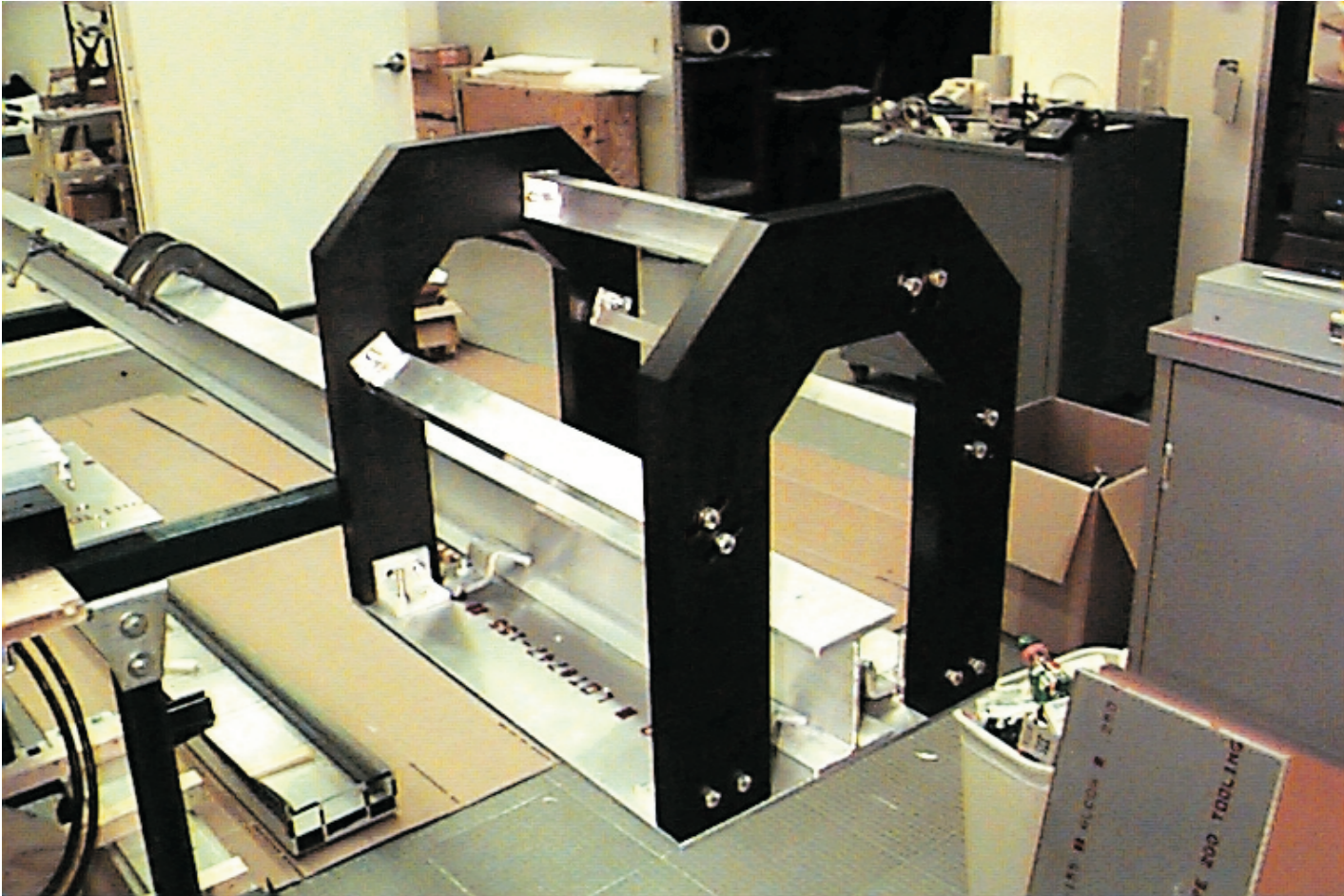
$$\sigma = 30 \oplus 70/\sqrt{N_{\text{hits}}}$$

Vertex position (L3)

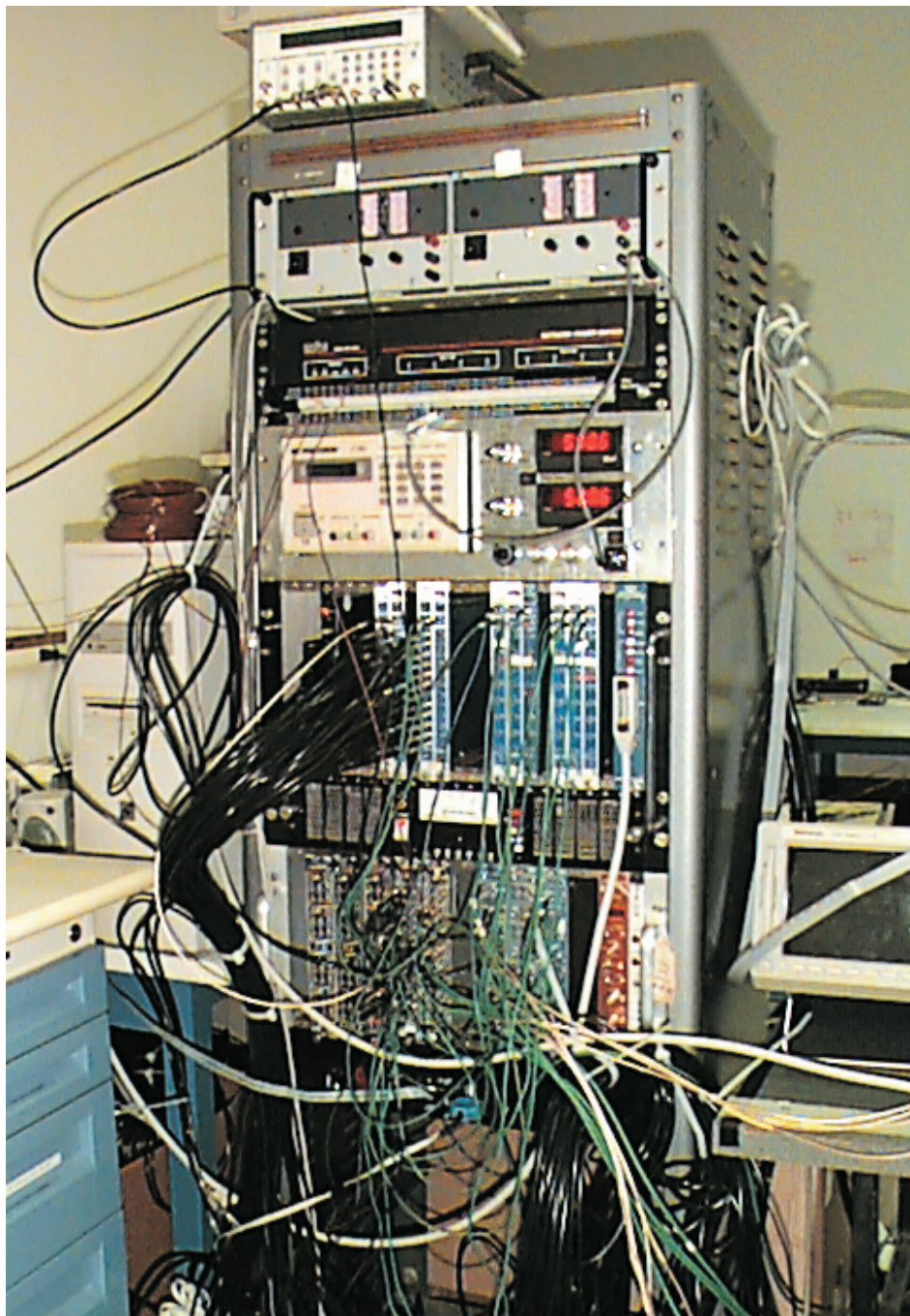
central Au+Au,  $\sigma_z \sim 0.5\text{cm}$   
peripheral Au+Au  $\sigma_z < 1.5\text{cm}$

ADCs sensitive to centrality!

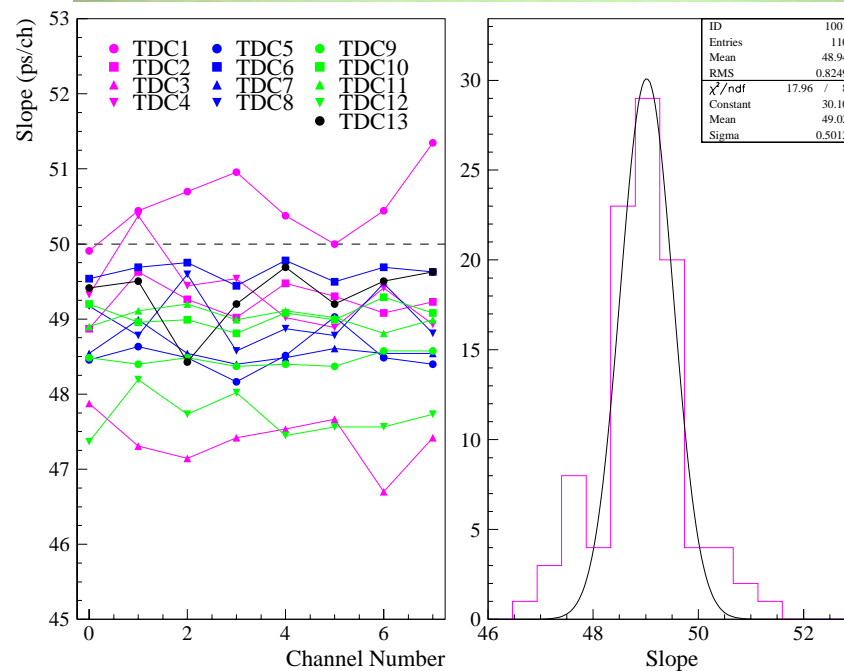
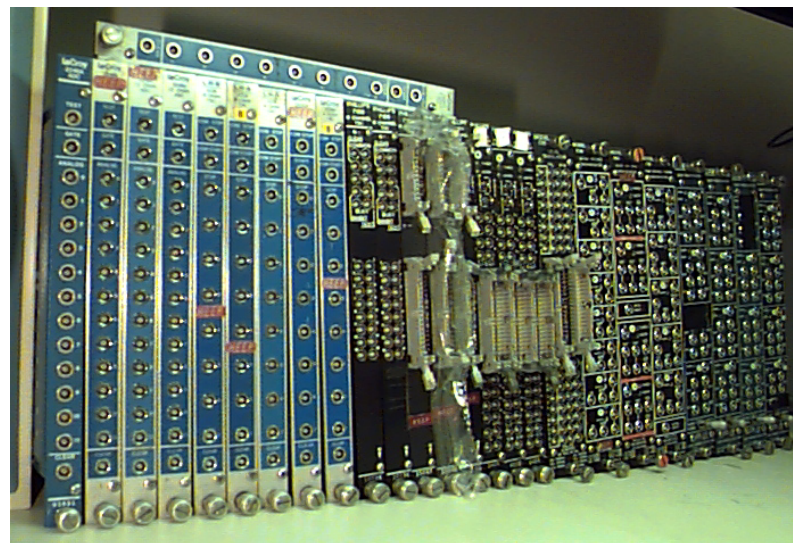
pVPD Hardware



## TOFp Rack Components

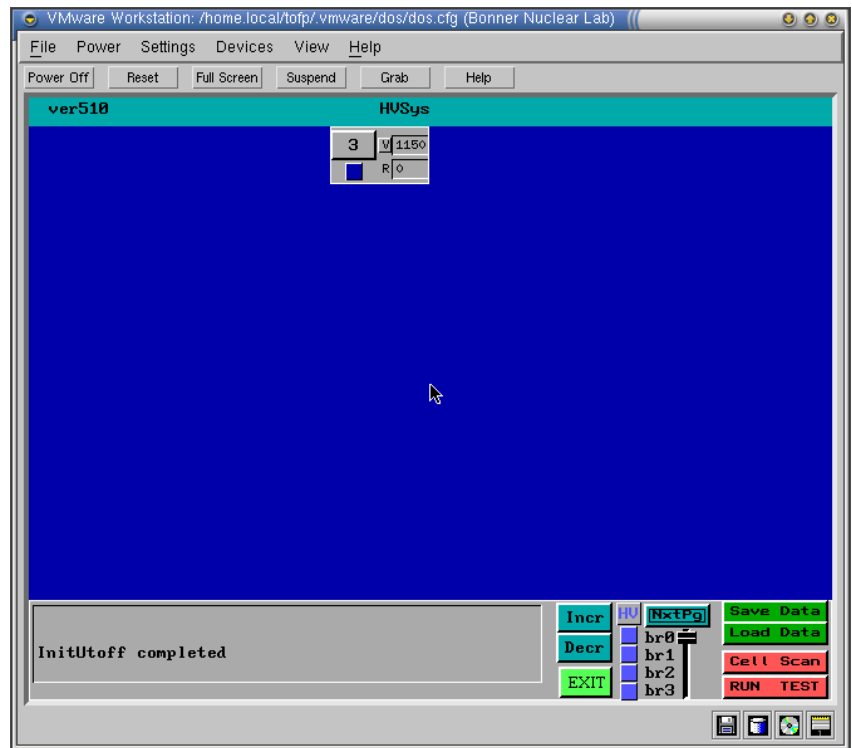


All done, under test (ready to go):  
 power supplies and cable assys  
 Remote Threshold System  
 HVSys Control  
 Camac modules



# HVsys

up and running...



(Frank Geurts)

```
xterm
Main>m
=====Main Menu=====
[F: File Menu][C: Cell Menu][H: HV Menu][E: Expert Menu]
M      : Monitor (continuously)
v      : display
b0..3  : set default branch
p0..3  : set default page on current branch
i      : (re-)init pedestals
m      : show this menu
x      : exit
q      : reset & exit
Main>v
testHV      : Short circuit test on HV ... passed
testHV      : power lines <0>:200.6V <1>:3V <2>:3V <3>:3V
readout     : readout of 41 cells completed
displayPage : Branch <0> status (page 0)
[ 7]: 1605/1610V [ 8]: 1426/1421V [ 9]: 1544/1578V
[12]: 1331/1353V [13]: 1434/1439V [14]: 1602/1624V
[15]: 1518/1529V [16]: 1315/1321V [17]: 1555/1565V
[18]: 1742/1732V [19]: 1592/1592V [20]: 1581/1538V
[21]: 1505/1466V [22]: 1566/1592V [23]: 1415/1421V
[24]: 1325/1339V [25]: 1476/1506V [26]: 1502/1515V
[27]: 1470/1493V [28]: 1505/1511V [29]: 1486/1497V
[30]: 1529/1556V [32]: 1449/1457V [33]: 1434/1466V
[34]: 1304/1321V [36]: 1576/1601V [37]: 1444/1457V
[38]: 1338/1375V [39]: 1536/1520V [40]: 1449/1457V
[41]: 1576/1615V [42]: 1626/1642V [43]: 1705/1736V
[44]: 1521/1547V [45]: 1713/1736V [48]: 1465/1439V
[49]: 1447/1479V [50]: 1605/1610V [52]: 1529/1533V
[54]: 1420/1443V [56]: 1463/1452V
Main>
```



## Network Power Switch

```
Terminal
Network Power Switch v3.00      Site: BONNER NUCL. LAB. -- RICE UNIV.

Plug | Name          | Status | Boot Delay | Password      | Default |
-----|-----|-----|-----|-----|-----|
 1 | CAMAC-crate    | ON     | 5 sec     | (defined)    | ON      |
 2 | NIM-crate      | ON     | 5 sec     | (defined)    | ON      |
 3 | ThresholdControl | ON     | 5 sec     | (defined)    | ON      |
 4 | pVPD-LV        | ON     | 5 sec     | (defined)    | ON      |
 5 | HV-Sys         | ON     | 5 sec     | (defined)    | ON      |
 6 | __empty        | ON     | 5 sec     | (undefined)  | ON      |
 7 | TOFp-LV        | ON     | 5 sec     | (defined)    | ON      |
 8 | TOFp-LV        | ON     | 5 sec     | (defined)    | ON      |
-----|-----|-----|-----|-----|-----|

Communication Settings: 9600,N,8,1
Modem Init. String:   ATEOMOQ1&C1&D250=1
Modem Disc. String:   (undefined)
Disconnect Timeout:   15 Min
Command Echo:         On
Command Confirmation: On

"/H" for help.

NPS> █
```

## “Test DAQ” Software

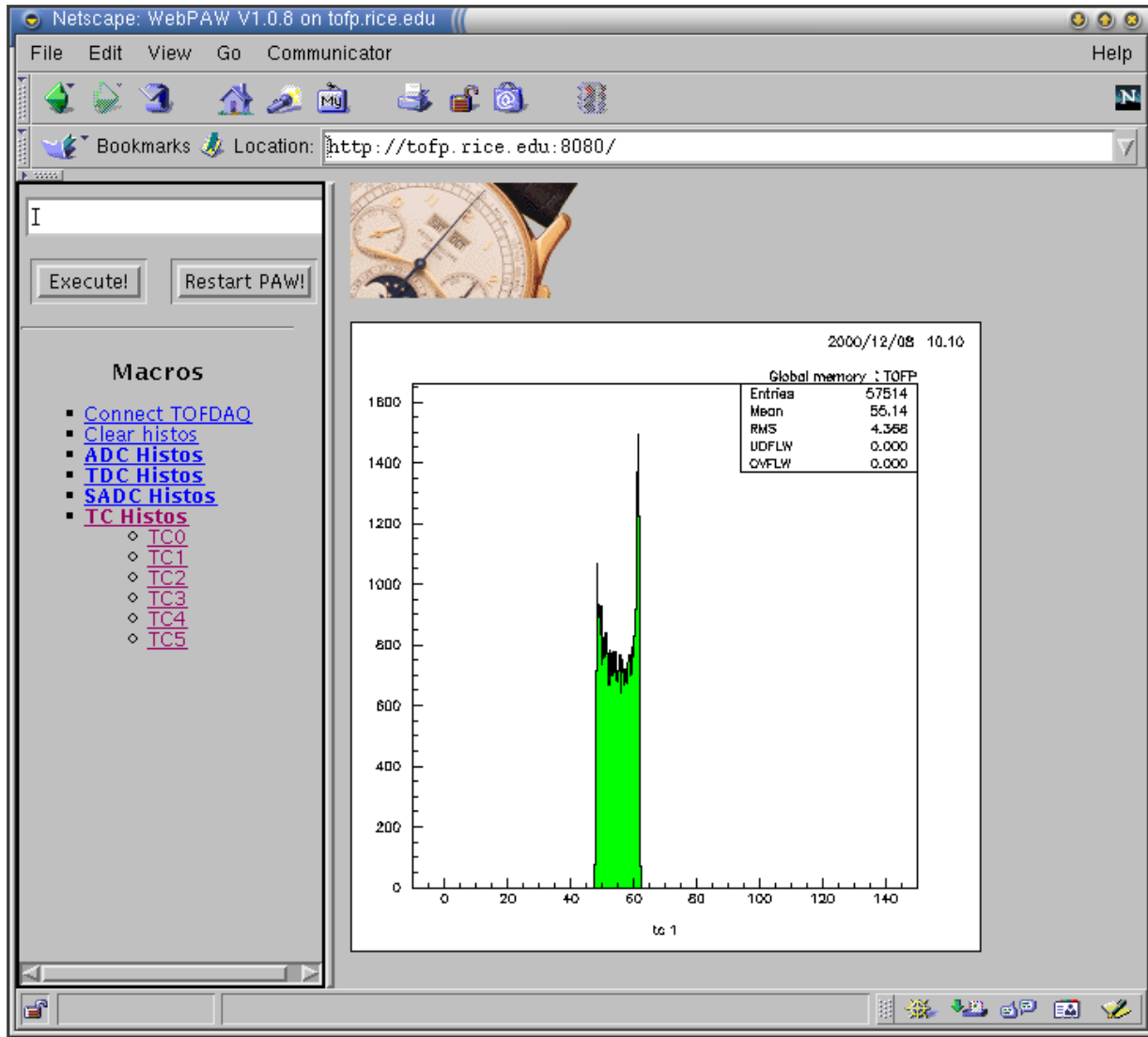
(Frank Geurts)

```
tofp
[tofp]~>tofdaq -f thermorun.rz -n 100
v0.3

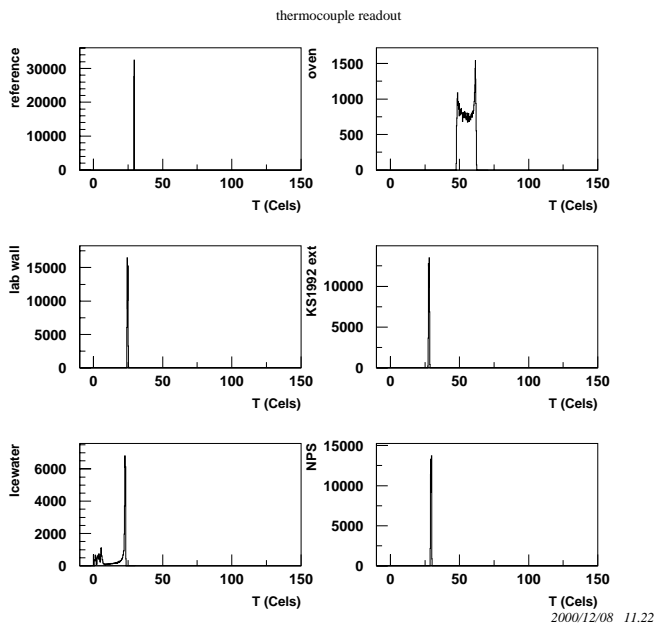
      Rice TOFp DAQ
      @2000 fg

      (ASCII art logo)

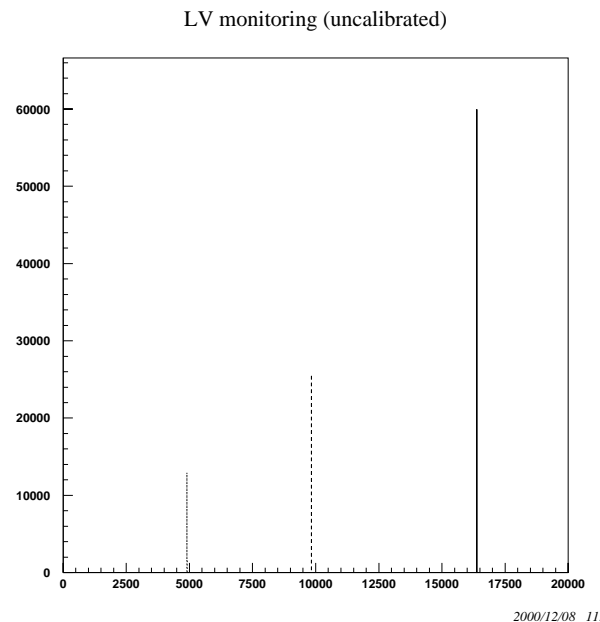
Initializing global section TOFP ..
GLOBAL MEMORY CREATED, offset from LQ = 235134262
number of events reset to 100
opening hbook file (thermorun.rz) ... done
processing 100 events
----- event 100 -----
close hbook file ... done
[tofp]~> █
```



## Temperature Monitoring



## Threshold Monitoring

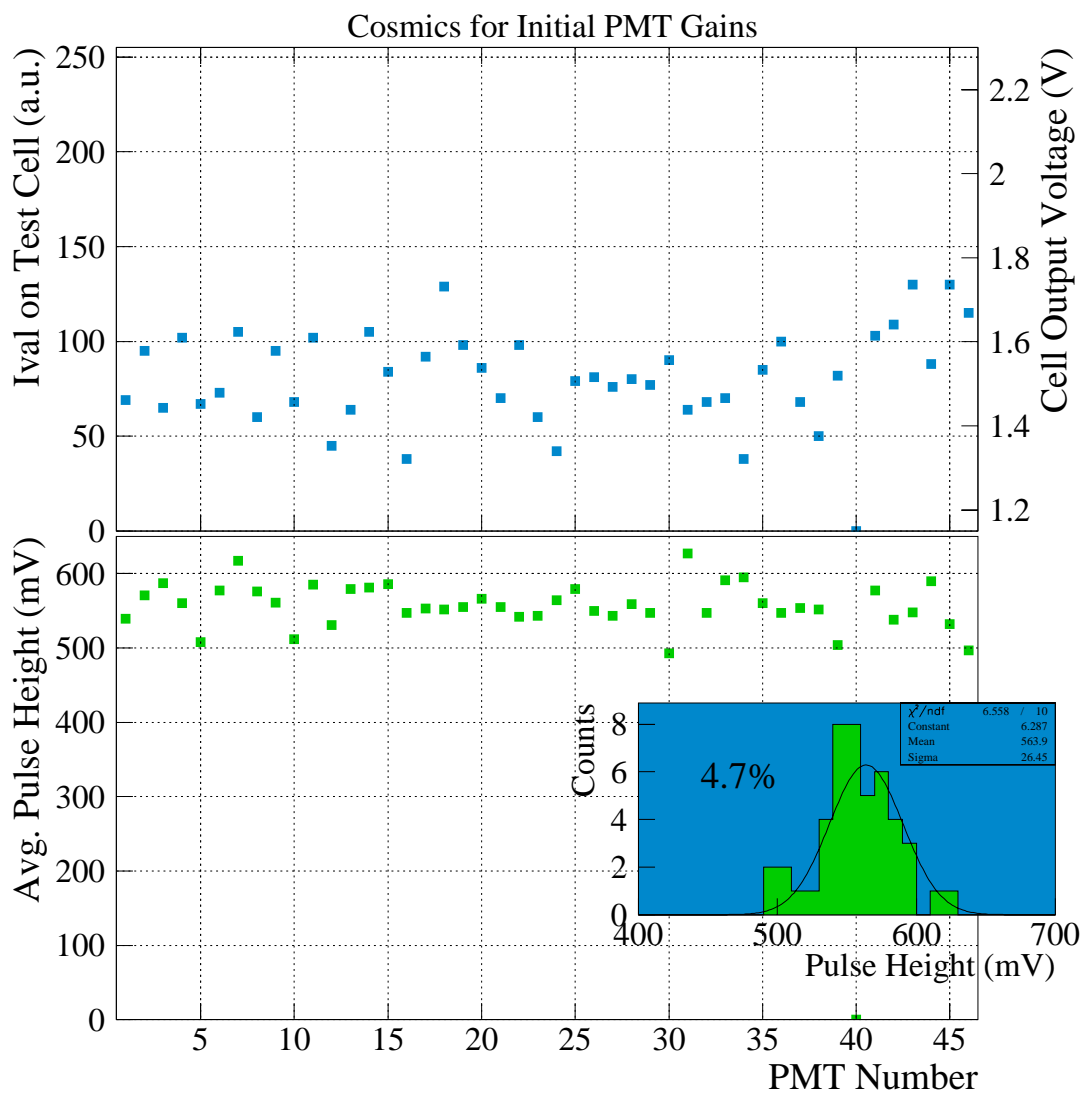


## Slat Assembly Tests

BC420 1.5" x 2cm x 20cm  
Hamamatsu R5946 w/ add'l RT and TTS specs...  
25 from Beijing Collaborators  
23 from construction funding  
HVsys cell for TOFp

Short cables, crossed slat arrangement, 4-fold coincidence, cosmic rate ~120/hour  
Input to infinium for  $\langle V_{min} \rangle$  measurements

→ Locate the approx. HVsys voltage setting  $\exists$  cell that results in  $\langle V_{min} \rangle \sim 550$  mV for cosmics...



41 TOFp slat assemblies plus 5 spares work fine...

at present, gain to PH scale known to ~5%, easy to improve upon...

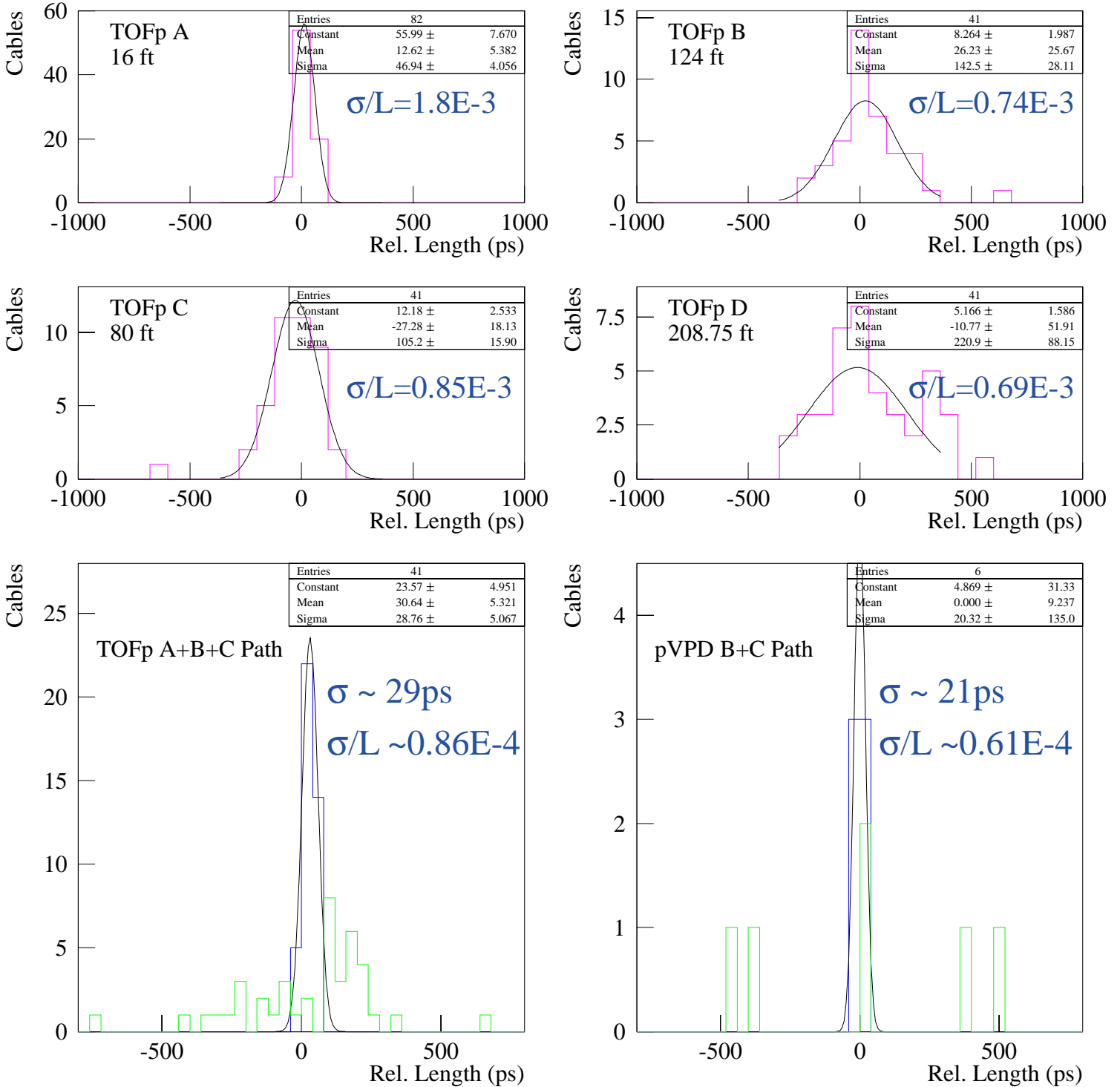
# Signal Cabling

~4 miles of coaxial cable in 8 different length groups...

tray timing path (41): [ FEE → A(odd) ] → B → disc → C → TDC  
 tray area path (41): [ FEE → A(evn) ] → D → ADC  
 pvpd timing path (6): [ FEE → A(odd) ] → B → disc → C → TDC  
 pvpd area path (41): [ FEE → A(evn) ] → D → ADC

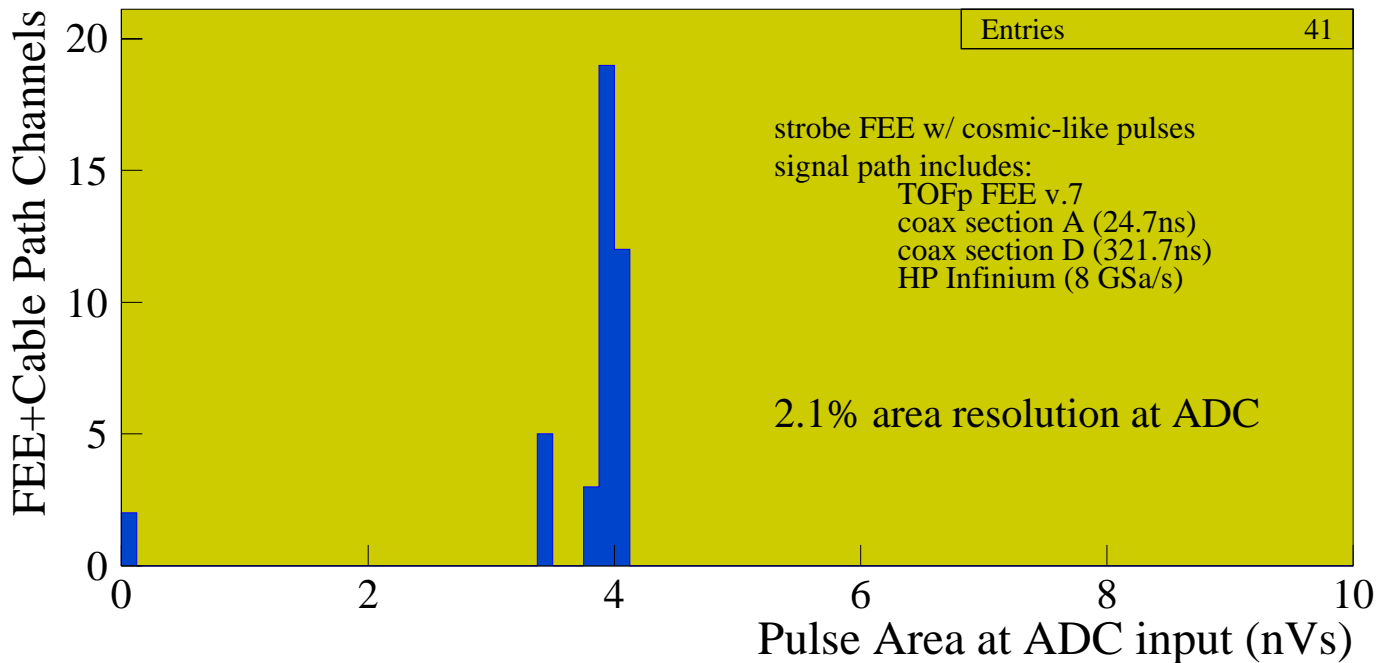
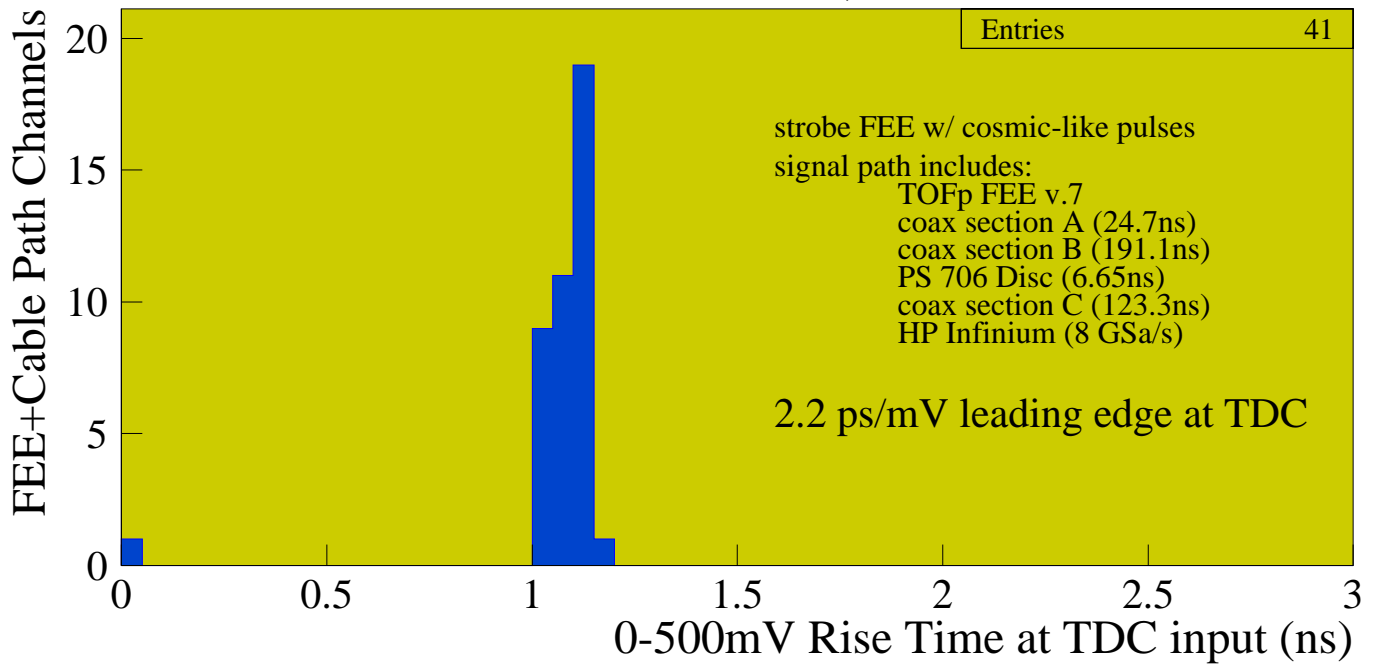
~340ns of cable per detector channel on each path

(M. Leyton, P. Sappenfield)



# First pulsing of the final-installed tray FEE and cabling...

## FEE and Cable Path Tests, 1/6/01



one A-section cable lemo connector needs resoldering

one FEE channel with a broken buffer...

two FEE channels needing ~12% trim of buffer output...

same tests for pVPD FEE+cabling, and for 4 spare FEE boards in progress...

## Tray Temperatures

the electronics inside the TOFp tray draw ~60W...  
once installed, heat removal via TPC water flow through tray...

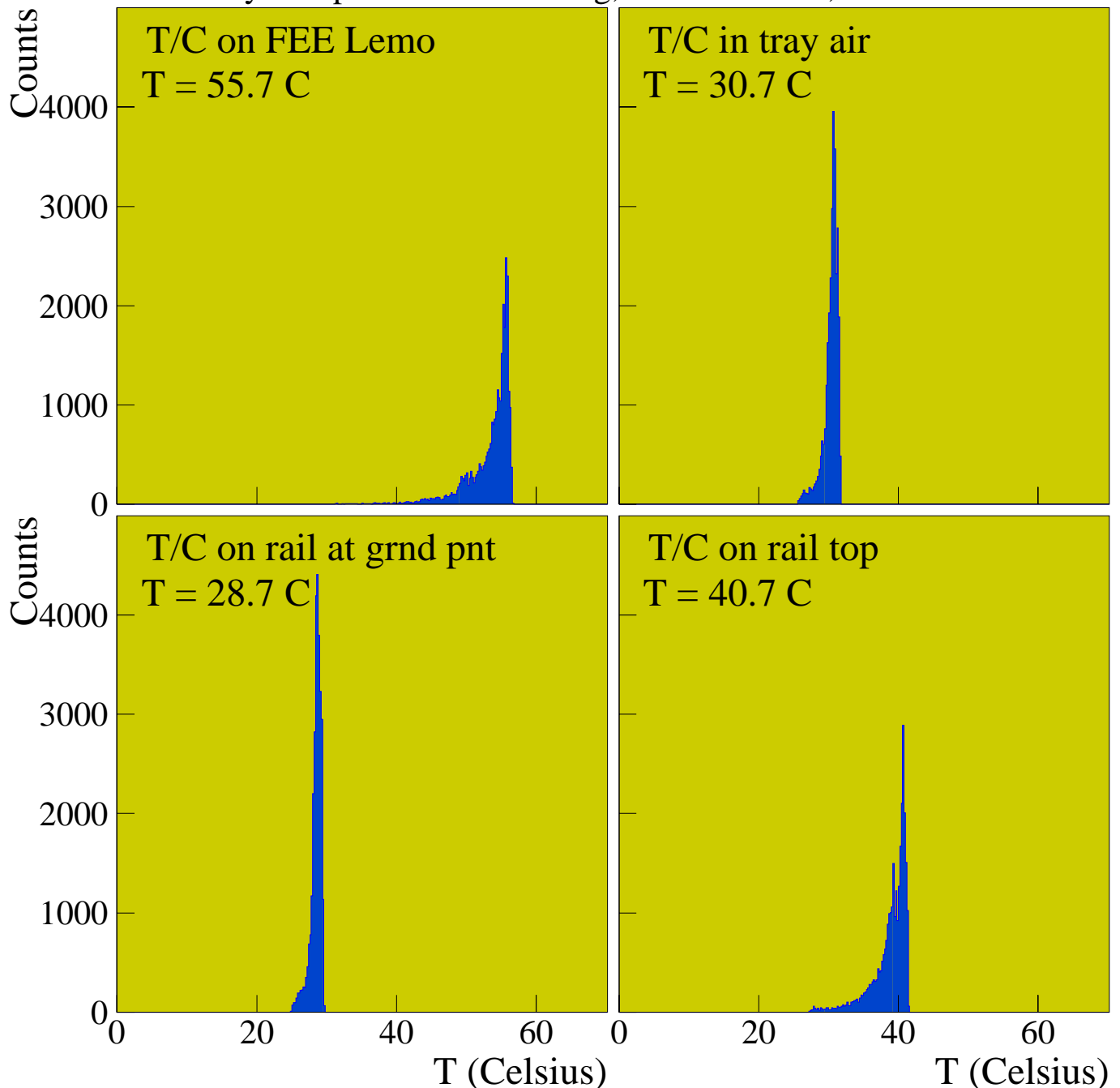
~8 hour monitoring run with

all tray systems on (HVSys & ThreshSys & FEE)  
tray closed.

remote monitoring of in-tray temperatures (120' Type TT → CAMAC)

no water flow, room temperature ~25 °C

Tray Temperature Monitoring, No water flow, 1/6/01

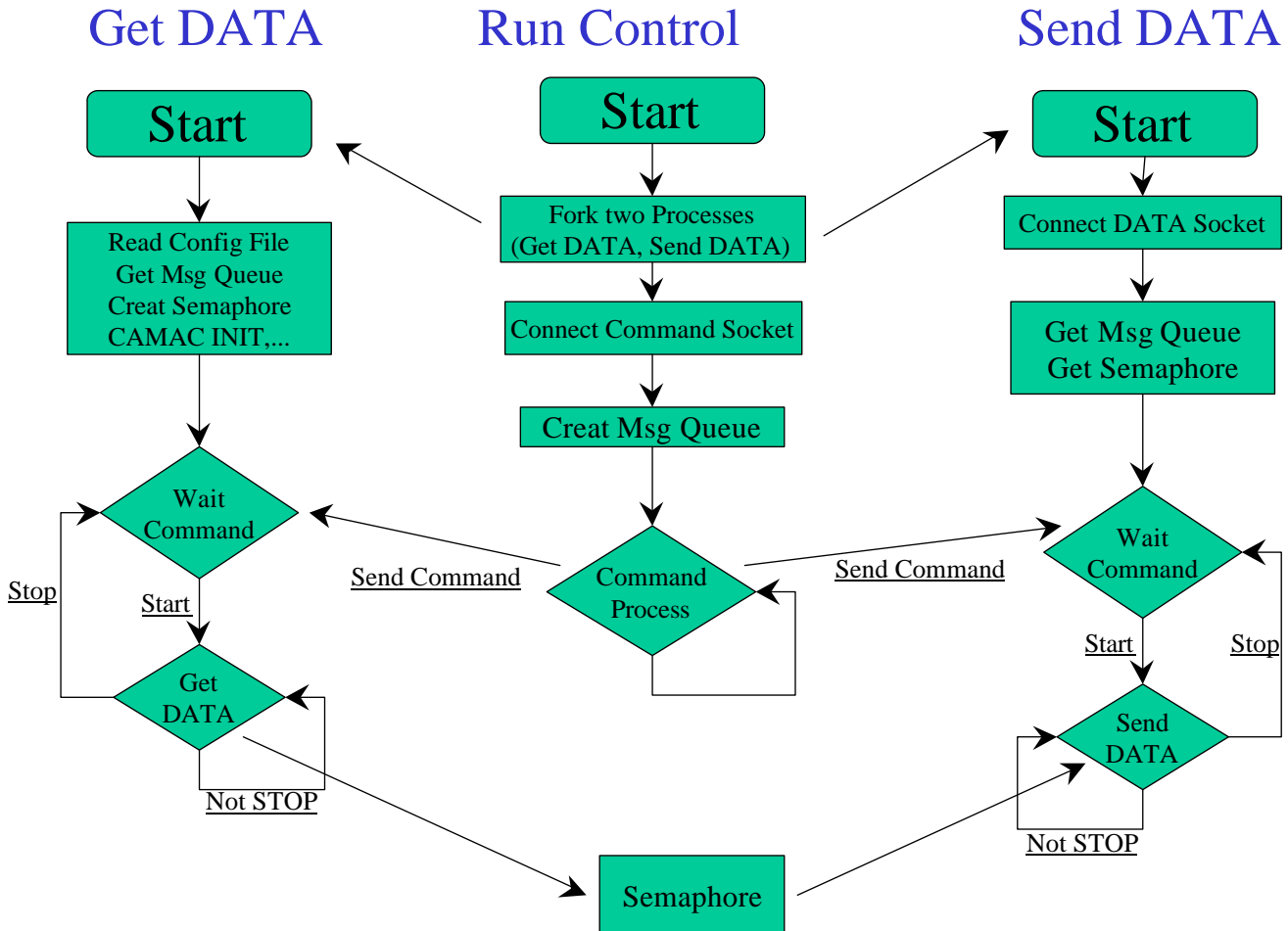


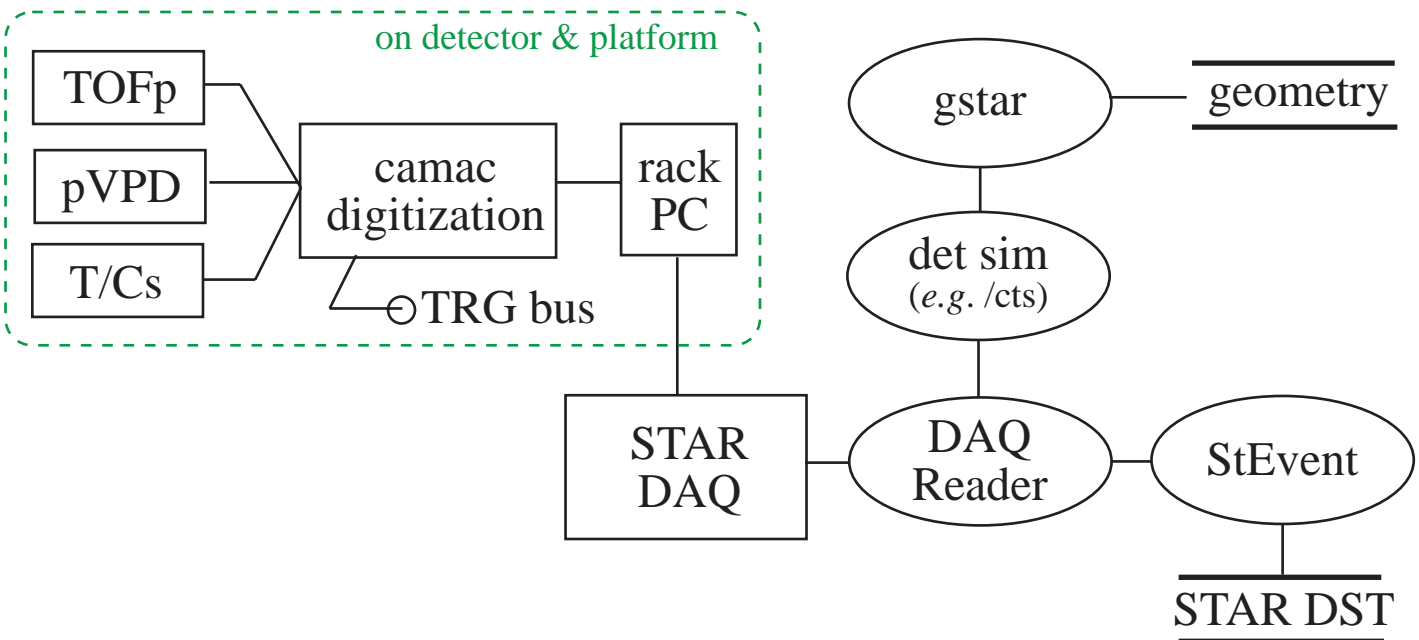
## ...read out CAMAC crate and pass TOFp Systems data to DAQ

Milestones:

- Successful setup of ADC/TDC-CAMAC-PC system at BNL
  - Dell OptiPlex GX110
  - Pulse Generator
  - CAMAC Crate, 3922 Crate Controller, 2915 PCI
  - Crate Verifier, Status Display, LAMG
  - 2249A TDC (5), 2228A TDC (2)
  - NIM Crate, 429A Fan in/out, 710 Disc
  
- Successful development of code for single-channel reads
  
- Successful implementation of Q-scan mode, after modification of the 2915 kernel driver
 

5 ADCs (60ch)	220 $\mu$ s
5 ADCs + 2 TDCs (76ch)	270 $\mu$ s
  
- recent finalization of STAR DAQ data banks (ADCs, TDCs, A/D)





- actual TOFp & pVPD geometry descriptions updated from AutoCAD released for general use under STAR CVS control
- Detector response simulator “/cts” revised to match TOFp Systest data
- Good progress on “TOF Maker” and StEvent entities...  
track quality selection, extrapolation, track-slat matching, PID traits...
- Raw data to StEvent for now...

#### near-term goals:

- Extrapolation to Planes in the TOFp geometry...
- Gradual divorce of TOFp codes from /ctf package  
w/ refocus of present /ctf codes on CTB only...
- maps and all possible test data that can be useful for offline analyses...
- “DAQ Reader”, with Herb Ward...
- Database integration, w/ Jeff Porter...