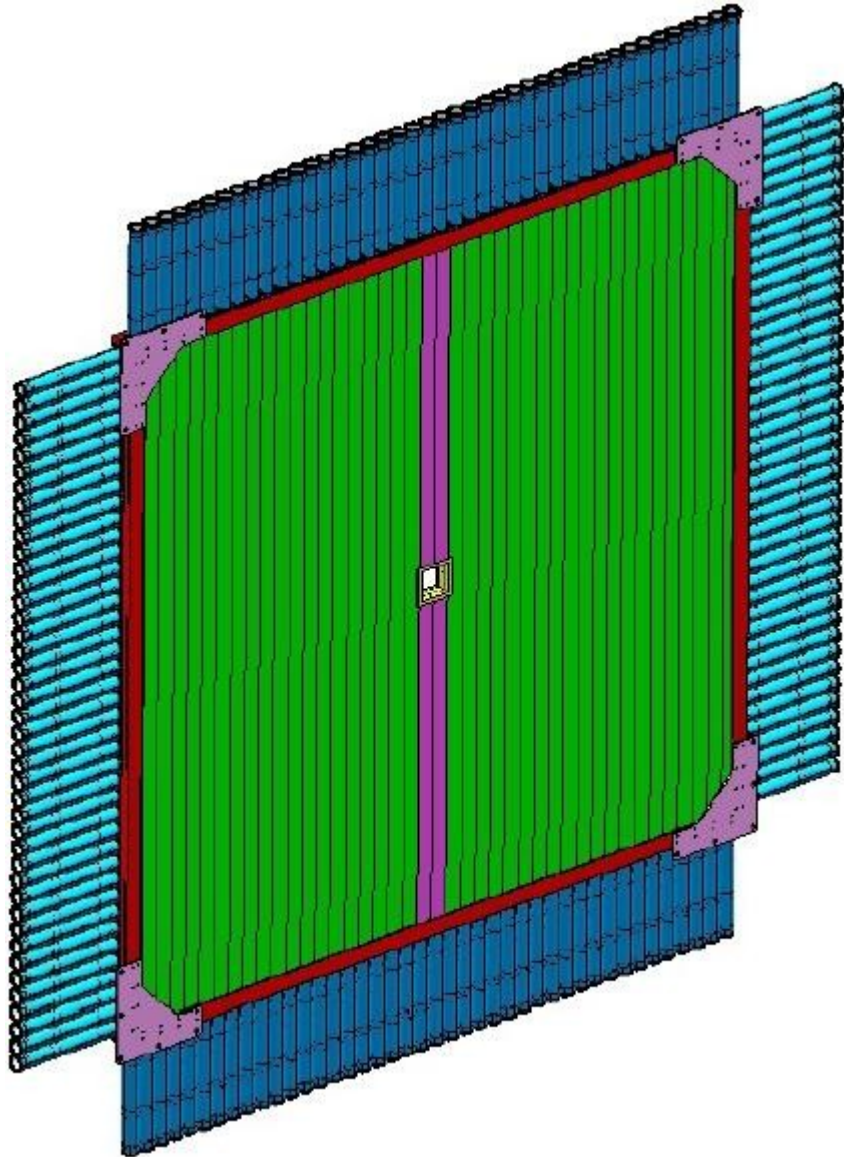


Status of the TOF



Alexander Ostrovidov
Florida State University

GlueX Collaboration Meeting

January 31, 2009

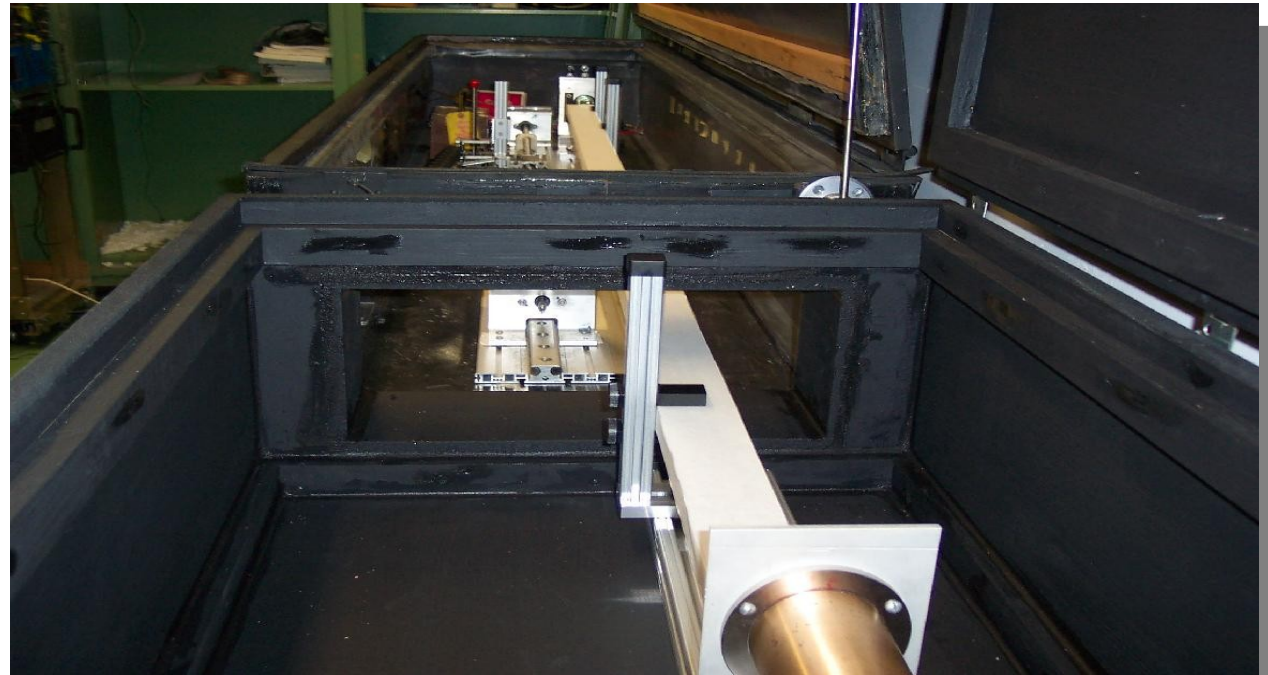
Current TOF efforts

- **Setup a Test Lab**
- **Study new PMT models**
- **Measure single paddle time resolution:**
 - For additional paddle geometries
 - For different wrappings

Extended light-tight box



- extended by 1m
- checked for light leaks
- new PMT holders
- building 1cm x 1cm and 4cm x 4cm scint. telescopes for triggering



Scintillator Paddles

- received 4 bars from Eljen and 2 old bars from IU
- EJ-200:
 - 2.1 ns decay time
 - 4 m bulk attenuation length
 - 425 nm emission peak
- Sizes:
 - 254 cm x 6 cm x 2.54 cm
 - 254 cm x 6 cm x 3 cm
 - 254 cm x 7 cm x 2.54 cm
 - 254 cm x 8 cm x 2.54 cm
- Tyvek, Al foil and 1mil Al Maylar wrappings

New Fast PMTs

- obtained PMTs of 4 different types from Hamamatsu and Photonis
- verified with a source and plateaued

tube	stages	gain	rise time(ns)	TTS(ps)	cost
H10570	8	5×10^5	1.8	250	\$810*
H10534	10	10^6	1.8	250	\$810*
XP2020UR	12	3×10^7	1.4	200**	\$1,610
XP20D0B	8	2.4×10^5	1.5	250	\$1,171

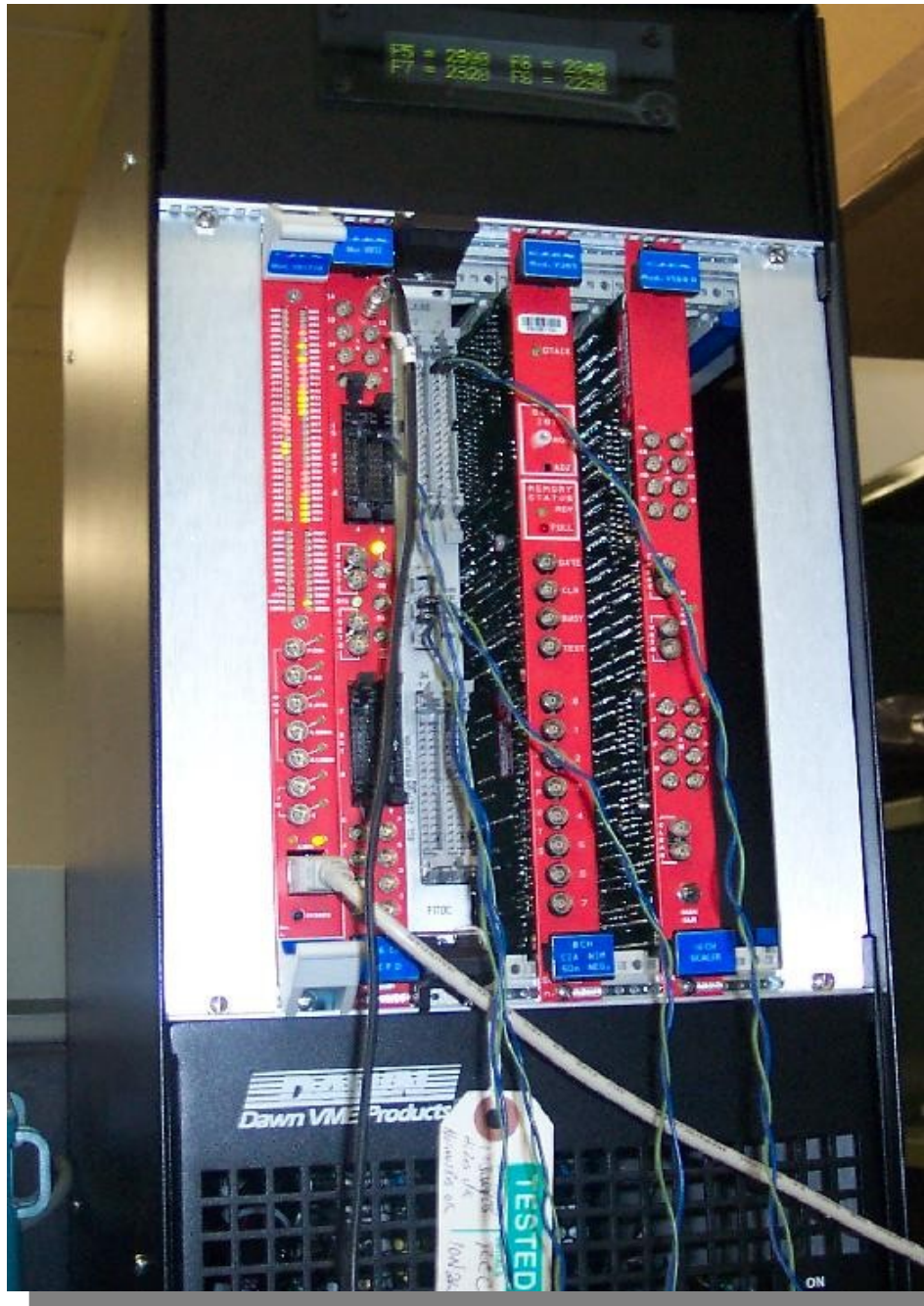


Base and μ -shield included

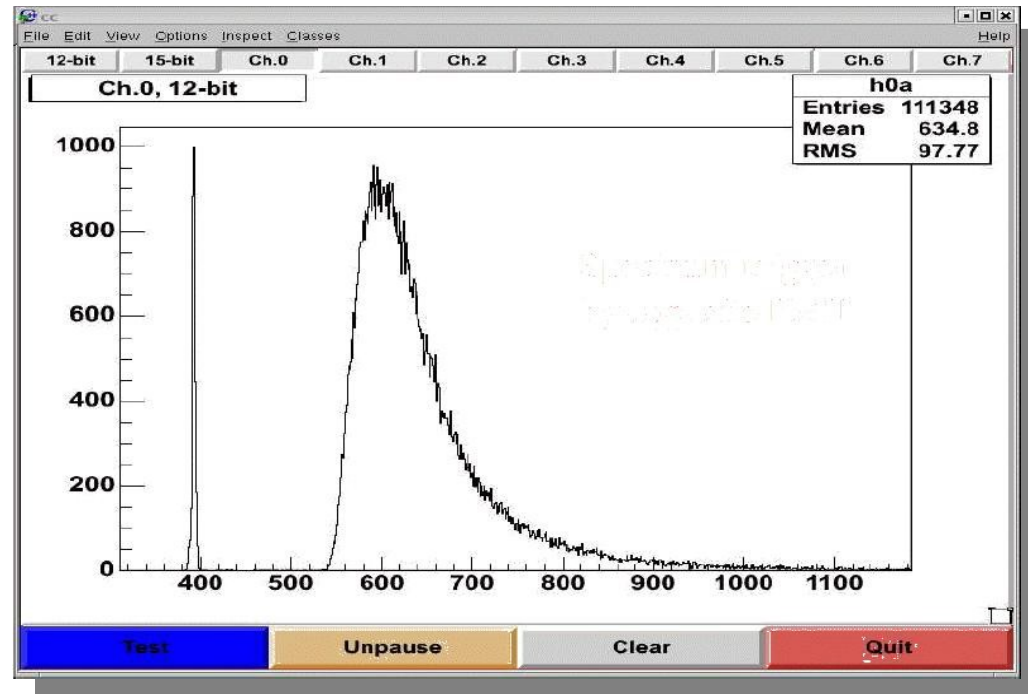


Base is extra \$250

Test DAQ station



- VME 64X crate
- Caen VME-USB v1718 bridge
- Caen v812 CFD
- F1TDC
- Caen v256 ADC (hoping for FADC?)
- Caen VME scaler
- Misc. NIM electronics



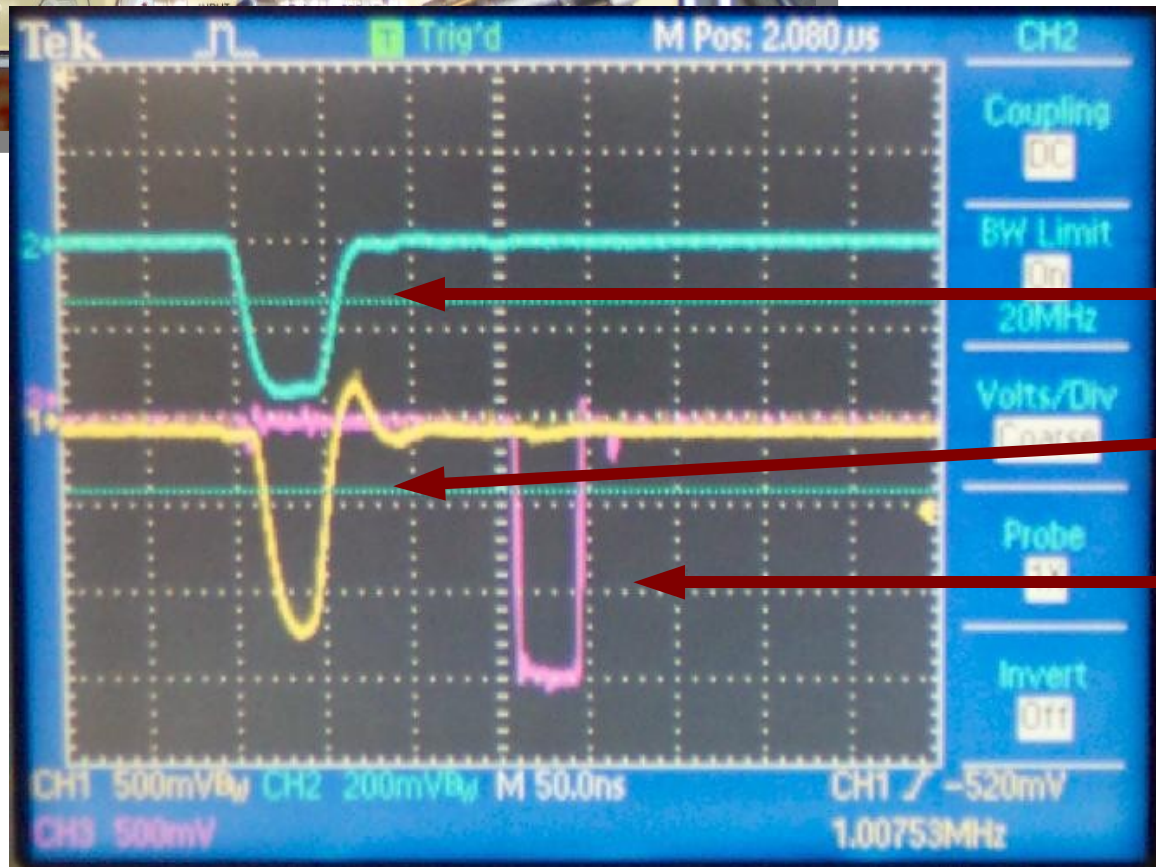
Notes on FITDC

- **We had to adopt FITDC library for our VME-USB bridge which doesn't support memory mapping**
- **TDC works well; bin size is indeed 56ps**
- **We found only 2 small issues with TDC:**
 - **rare random noise bursts**
 - **impossible to initialize with front-panel signals present. Suggested trick “switch to backplane – initialize – switch to front panel” works but invalidates the first few thousand hits**

Time Walk Measurements



- Using pulses of varying amplitude from HP 8116A
- Has separate trigger output



signal

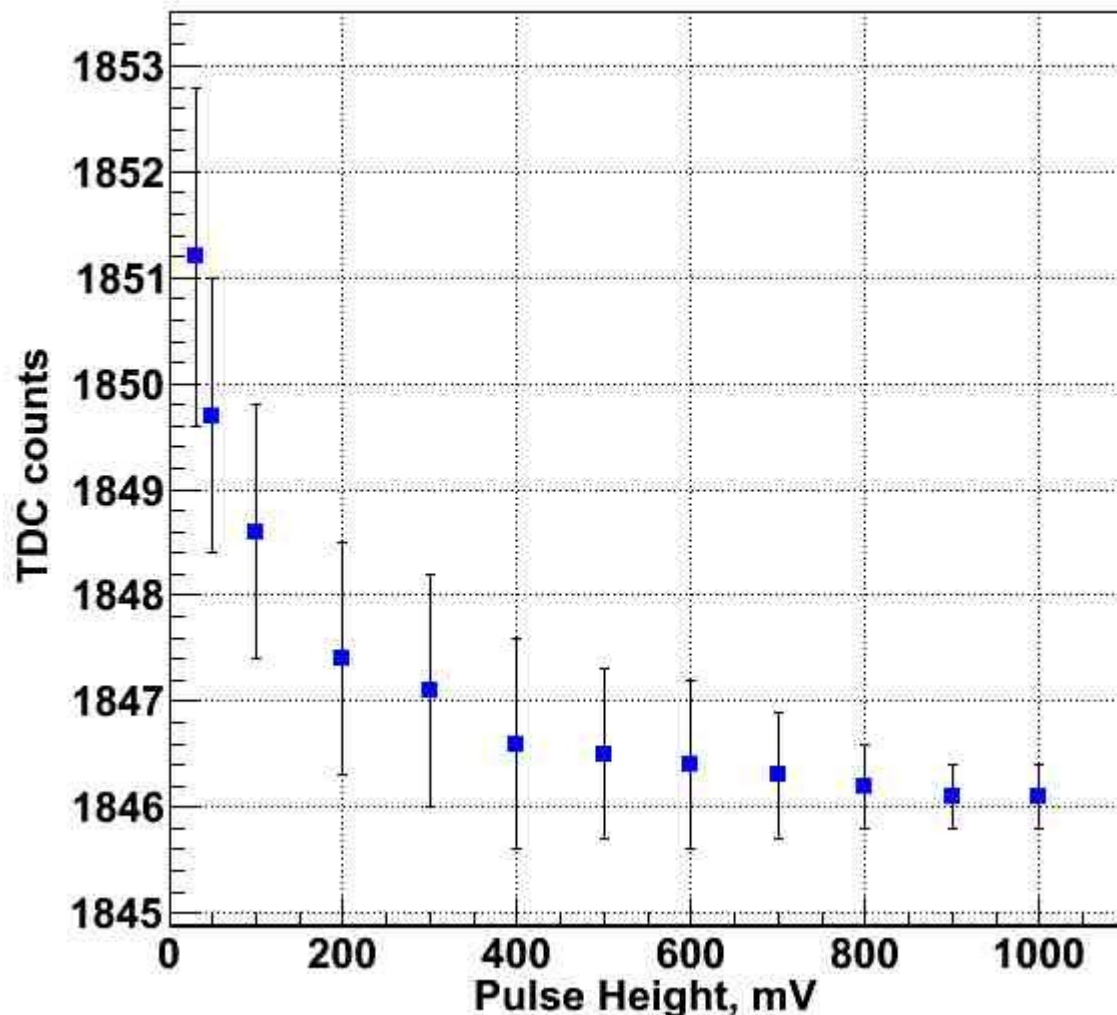
TDC start

TDC stop

Time Walk Measurements

CAEN v812 CFD

Time Walk with CFD



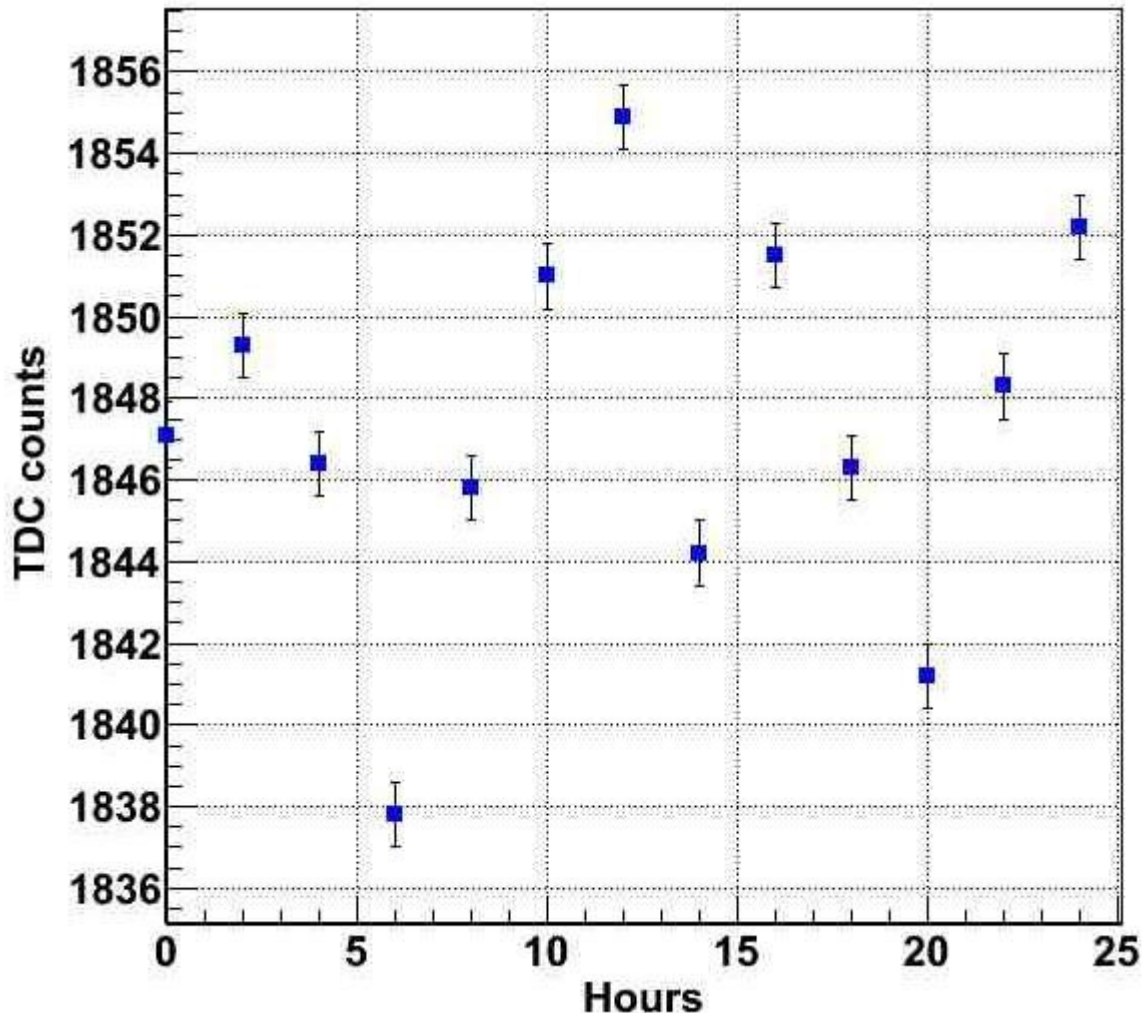
Time walk for the range
from -30mV to -1V:
5.1 TDC counts = 286 ps

CAEN specification
from -50mV to -5V:
 ± 400 ps

For comparison, time walk
for NIM 771 LED for the
range from -100mV to -1V:
23.6 TDC counts = 1.33 ns

Puzzling Instability

The same -500mV 50ns signal over 24hrs:



- unexplained drift of about 1ns
- need to find the source before proceeding with further measurements

Short-Term Plan

- **Waiting for UVT Lucite to manufacture light guides (in 2 weeks?)**
- **Do quality-control measurements of the scintillator bars**
- **Do timing resolution vs position measurements:**
 - **for different paddle geometries and PMTs**
 - **different wrappings**
 - **with cosmic rays**
 - **with ^{90}Sr source**
 - **different shapes of light guides**
 - **under different incident angles**