



TOF Status and Schedule

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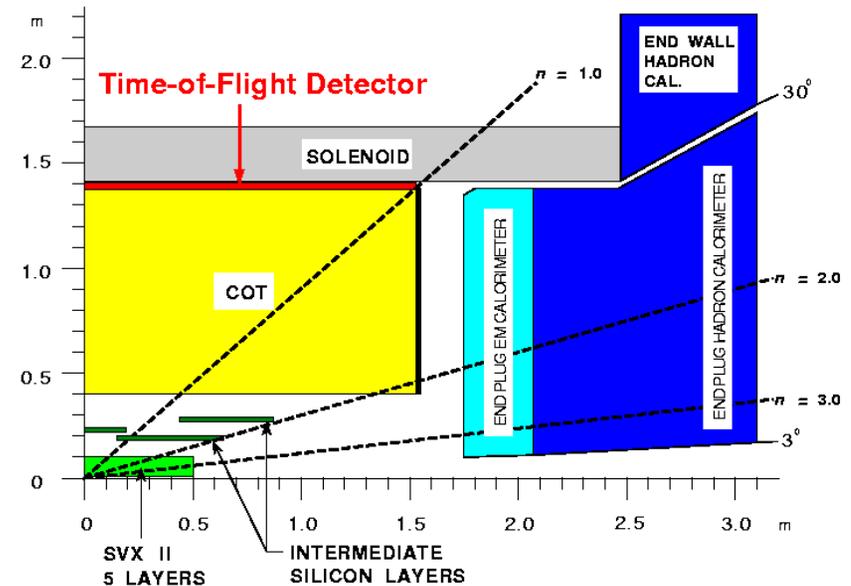
Outline

- Detector Overview
- Status and schedule
 - FE Electronics
 - Calibrations.
 - Online integration.
- First look to the data
 - 1x8 Run
 - 36x36 Run
- Summary



Detector Overview

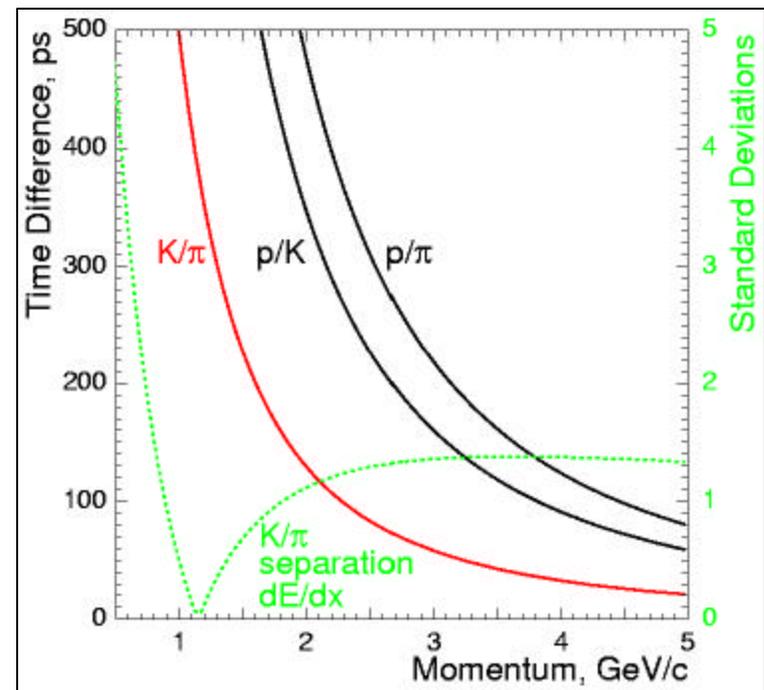
- 216 Scintillator bars (279cm x 4cm x4cm) with phototubes attached to both ends.
- Sandwiched between the solenoid inner wall and the COT at R~ 138cm.
- Pseudorapidity coverage $|h| < 1$.
- Bicron plastic scintillator BC-408 with fast rise times ~ 0.9 ns.
- Hamamatsu R7761, fine mesh, 19 stages PMT , gain reduction ~ 500 @ B=1.4T.
- Differential signal is preamplified to compensate gain reduction
- Custom electronics to reach precision requirement





Detector Overview

- Physics motivation: K-id for B flavor tag.
- Expected 100 ps resolution : 2σ separation of
 - K and p for $p < 1.6$ GeV/c
 - p and K for $p < 2.7$ GeV/c
 - p and p for $p < 3.2$ GeV/c
- TOF and dE/dx are complementary.





Status Snapshot

- Scintillator bars ✓
- PMT assembly ✓
- Cables ✓
- HV supplies ✓
- FE electronics (in progress)
- Clock fanout (in progress)
- Calibrations (in progress)
- Online Integration ✓
- Offline (See I.Furic talk)



FE Electronics

- Measure time and charge on 432 channels
- PMT \Rightarrow base \Rightarrow preamp \Rightarrow 30° cables
- Transition board (9 channels) consists of:
 - Main transition board (TOMAIN board)
 - Three daughter boards (TOAD boards)
- Each channel on TOAD board:
 - PMT pulse converted to current, read out using QIE (CAFE card)
 - Time between hit and common stop converted to voltage (TAC), read out using 12-bit ADC (deCAF card)
- CAFE and deCAF read out using ADMEM
- Also contains charge injector and monitoring circuits



Electronics: Clock Fanout System

100 ps resolution requires dedicated clock fanout:

- Central Clock Fanout & Monitor (CCFM)
 - Distributes clock signals to 8 crates
 - Also measures propagation delay between CCFM and LCF modules
- Local Crate Fanout
 - Distributes signals to all 6 transition boards in crate
- Signal for timing calibration distributed in parallel
- Calibration signal generated using digital delay generator (DDG)



Electronics: Status & Schedule

- Installed:
 - ❑ Base, preamp, ADMEM, preamp LV supplies, cables.
 - ❑ Clock: CCFM module, 2 out of 8 LCF modules (remaining 6 ready for installation)
 - ❑ Digital Delay Generator
 - ❑ Production transition boards, version 1.0 (12 Channels)
- Complete electronics chain tested in 1x8 and 36x36
- To be delivered:
 - ❑ TOMAIN and TOAD boards, version 1.1
(Ready for installation end of June)
 - ❑ 8 production -2 volt supplies:
(To be installed end of June – early July)

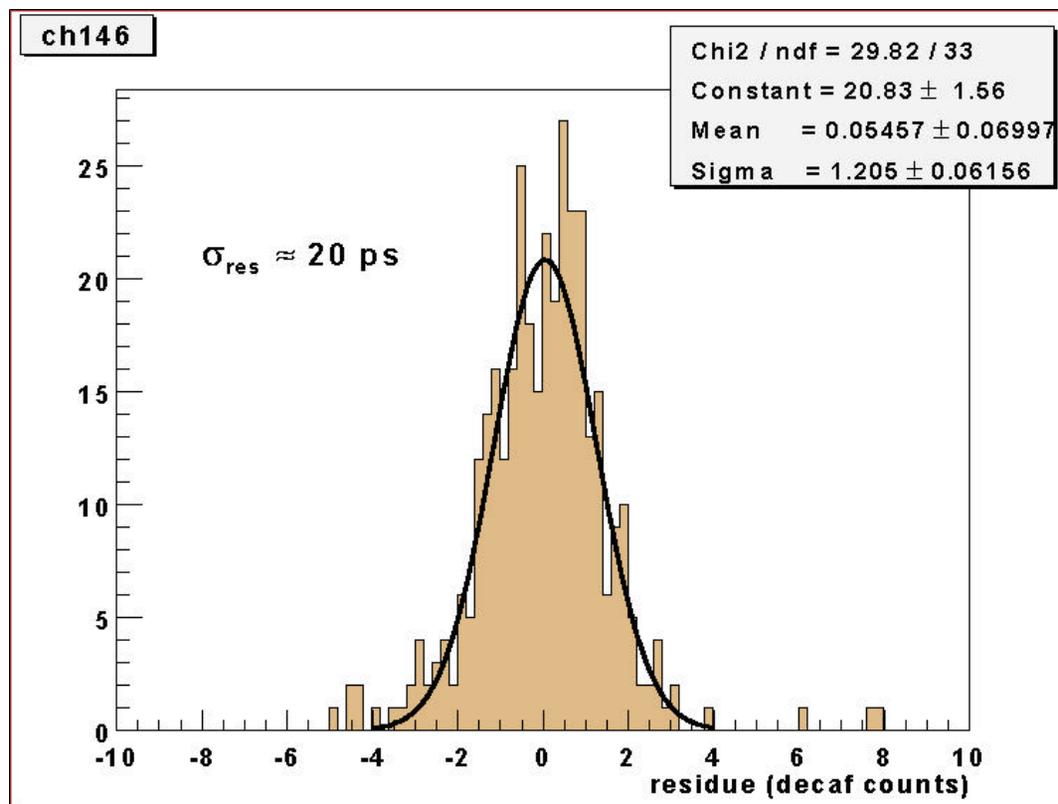
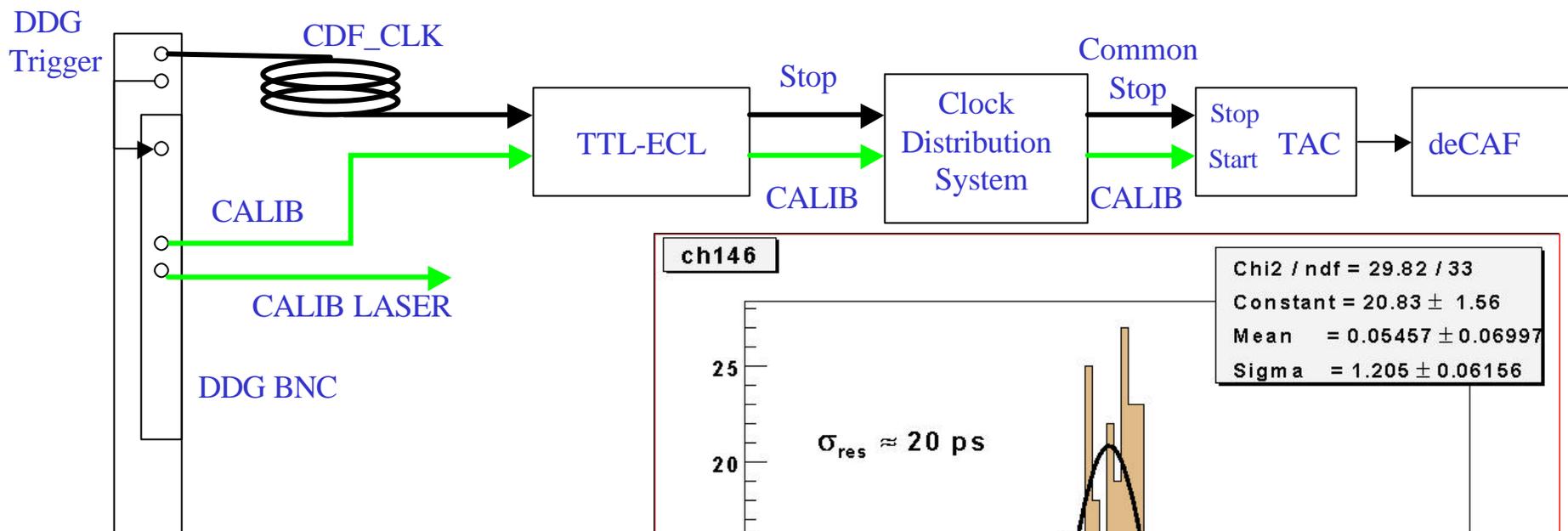


Calibrations: QIE and TAC

- Charge pedestals and CAFE QIE chip calibration.
 - ❑ Fully Integrated into the online
 - ❑ DBANA implemented
- TAC Calibration (still in progress)
 - ❑ Determine deCAF (TDC) counts vs. time dependence
 - ❑ All hardware installed (See next slide)
 - ❑ Calibration now at expert level only, results transferred to development DB.
 - ❑ Working on Run Control integration
 - ❑ D-Mode consumer under development



Calibrations: TAC (cont'd)



- Fitting DDG delays vs. deCAF counts (resolution $\sim 20 \text{ ps}$).
- Intrinsic per point resolution: $\sim 10 \text{ ps}$



Calibrations: Laser & Offline

- Laser Calibration
 - ❑ Ingredients to laser pulse the scintillator
 - ❑ More effort needed (low priority).
 - ❑ After detector roll in, detector check out OK
- Offline Data Calibration
 - ❑ Software framework for creation of calibration algorithms implemented (e.g, speed of light calibrations)



Online Integration

- TOF ADMEM boards readout integrated into CDF.
- Electronics configuration through Run Control using Run and Hardware database.
- Calibration Consumers launched from Run Control
- Storage of the calibration parameters in database.
- Occupancy, ADC, TDC, etc.. histograms in YMON.



Online: DB & Consumers

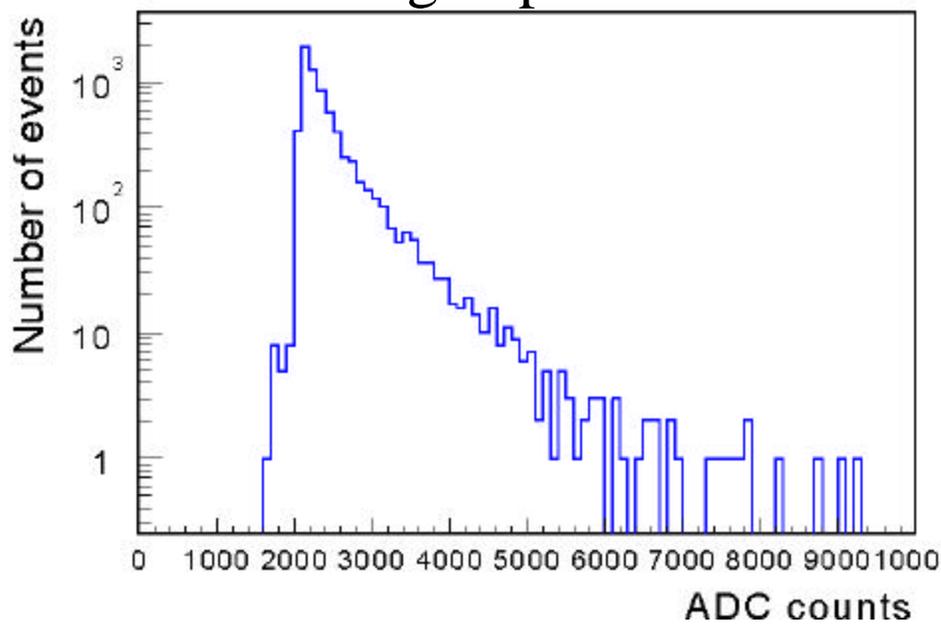
- QIE and TAC calibrations needed for data taking \Rightarrow
Priority: calibration parameters available in database

Data Table	Database	Consumer
TOFQie	production	TofQiePed
TOFQiePed	production	TofQiePed
TOFTac	development	TofTac



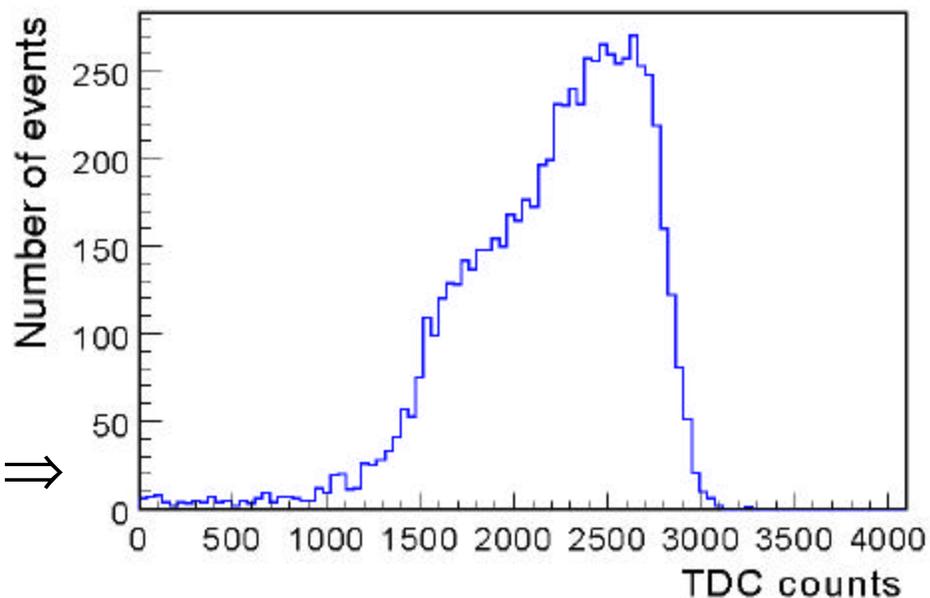
Data: 1x8 Run

Charge Spectrum



• Timing in the detector. \Rightarrow

- 1 TOMAIN + 1 TOAD \Rightarrow
3 channels (West) instrumented.

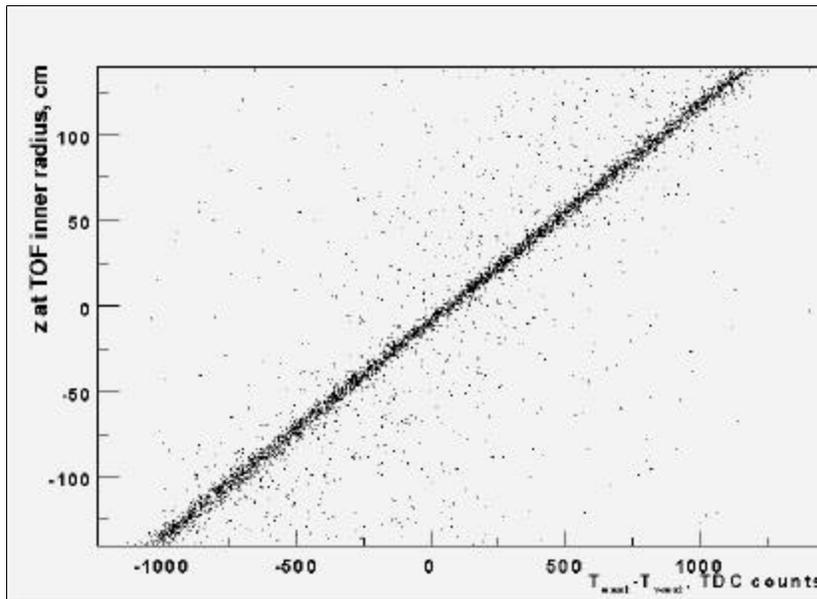




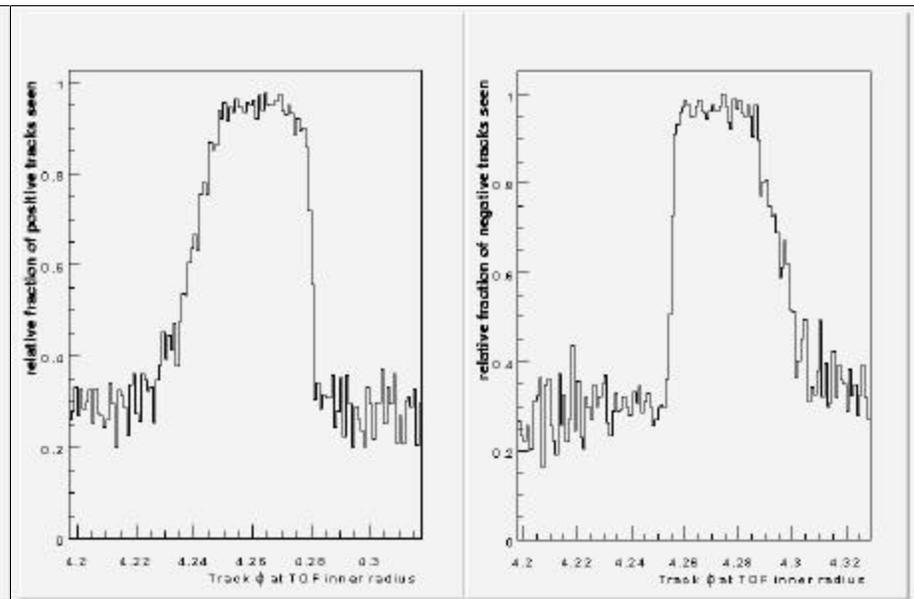
Data:36x36 Run

- 12 Channels instrumented (3 W,9E).
- Components of the FE were tuned (pedestals counts from ~2000 to 250).
- Due to configuration software bug, ADC information is not useful.

Track position vs. Time difference



Fraction of detected tracks





Summary

- Remaining Tasks:
 - ❑ FE Electronics ready to install by end of June.
 - ❑ TAC online integration mid-June.
 - ❑ HV monitoring needs to be polished.
- ~ July **the fun begins...** *if we get access*
 - ❑ Data from full detector to study
 - ❑ Determine operational parameters
 - ❑ Refine calibrations
 - ❑ Get 100ps resolution and ... have a party