BIGBITE Status

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- BigBite experiments
- BigBite spectrometer
- Trigger and auxiliary planes
- Cosmic test
- Wire chambers
- BigBite detector configurations

Hall A Collaboration Meeting

December 12, 2003

BigBite experiments

- Approved experiments

Exp number	Name	In BigBite
E01-015	SRC	proton
E02-013	G_E^n	electron
E02-108	^{3}He(e,e$'$d)	deuteron
E01-014/PR04-007	π^0 threshold	proton
E02-101	d(e,e$'$p)	proton
E03-004	Transversity	electron

- Submitted to PAC 25

PR04-012	Θ^+	proton

BigBite spectrometer

- Caracteristics

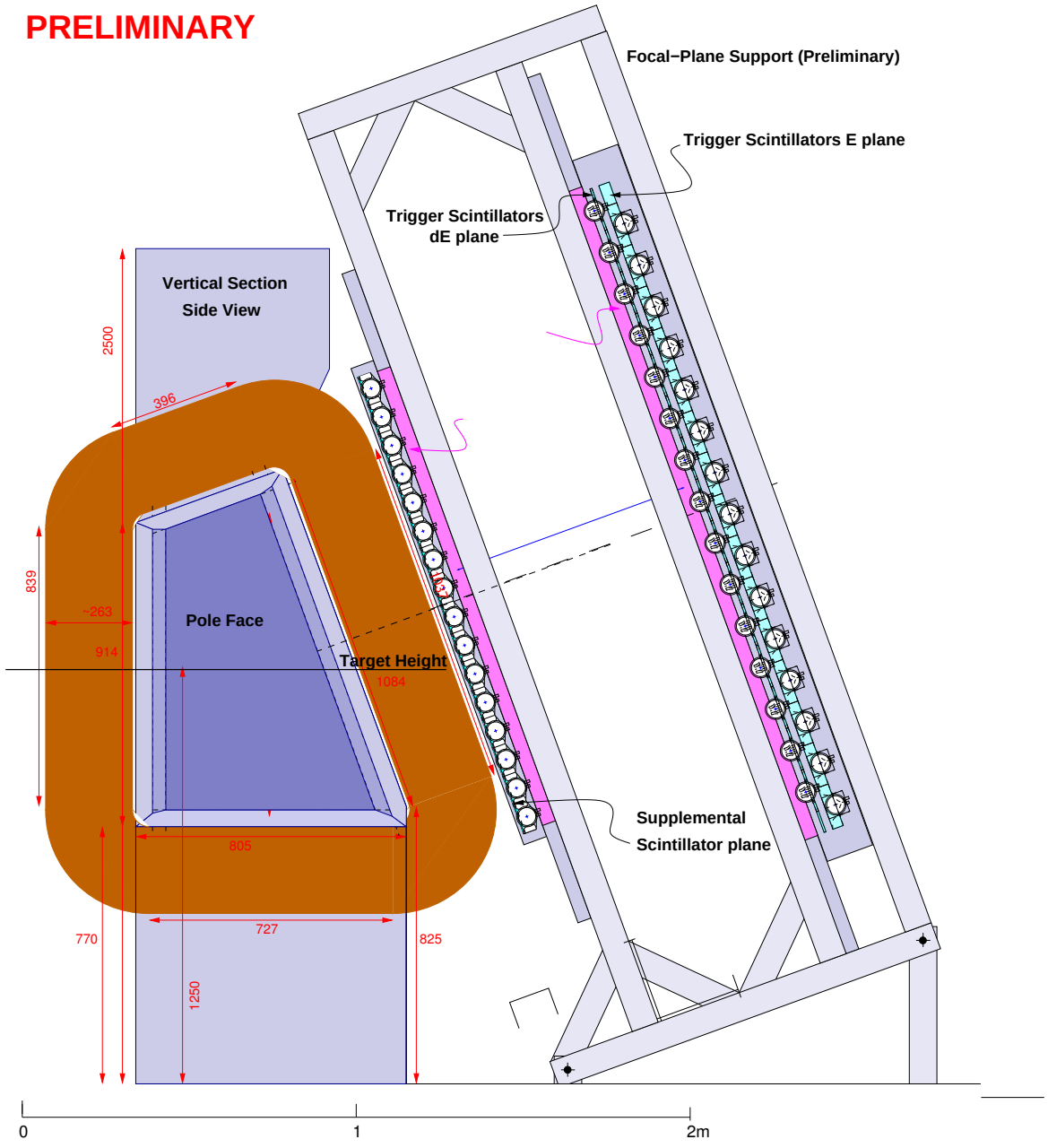
Horizontal acceptance	$\pm$80 mrad
Vertical acceptance	$\pm$300 mrad
Solid angle	96 msrd
Momentum range	200$-$900 MeV/c
Proposed momentum resolution	$\sim$1%

- Not been fully powered yet, need water cooling system
- “Wings” have been mounted to fit on the stand

BigBite Stand

- All parts are here
- Need to be assembled
- Alignment work
- Tracks
- Positioning

Detector package for SRC



Scintillator planes

- Detectors

  ▷ Trigger plane: 24 E-bars (30 mm thick), 24 overlapping δE-bars (3 mm thick), read on both sides

  ▷ Auxiliary plane: 56 bars (2.5 mm thick), read on one side

  $\Longrightarrow$ from time of flight, momentum resolution of $\sim$ 12%

- Electronics

  ▷ QDC: VME Caen v792

  ▷ TDC: VME Caen v775, 35 ps resolution

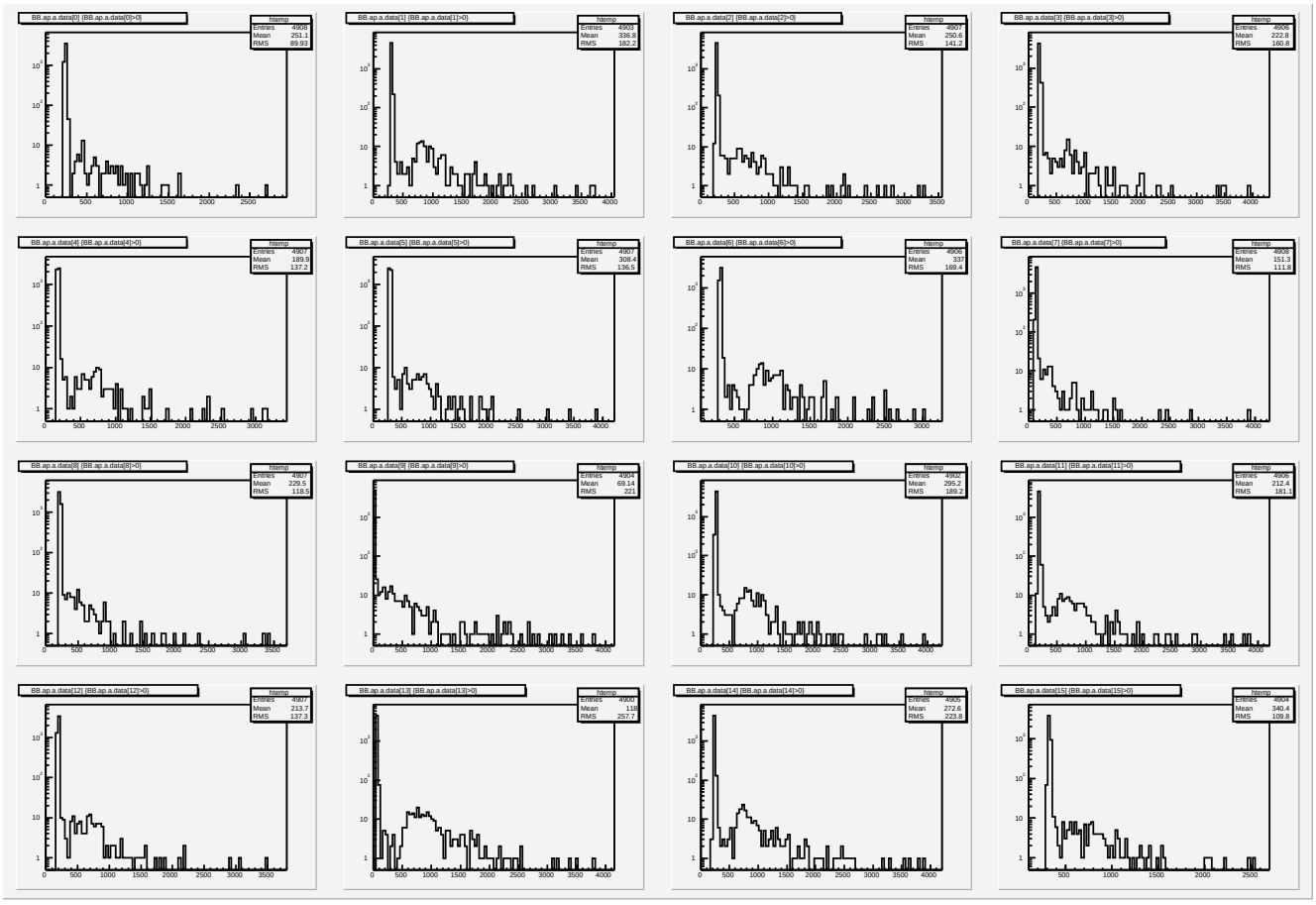
  ▷ CODA 2.2.1

  $\Longrightarrow$ DAQ system up and running

Detector cosmic calibration

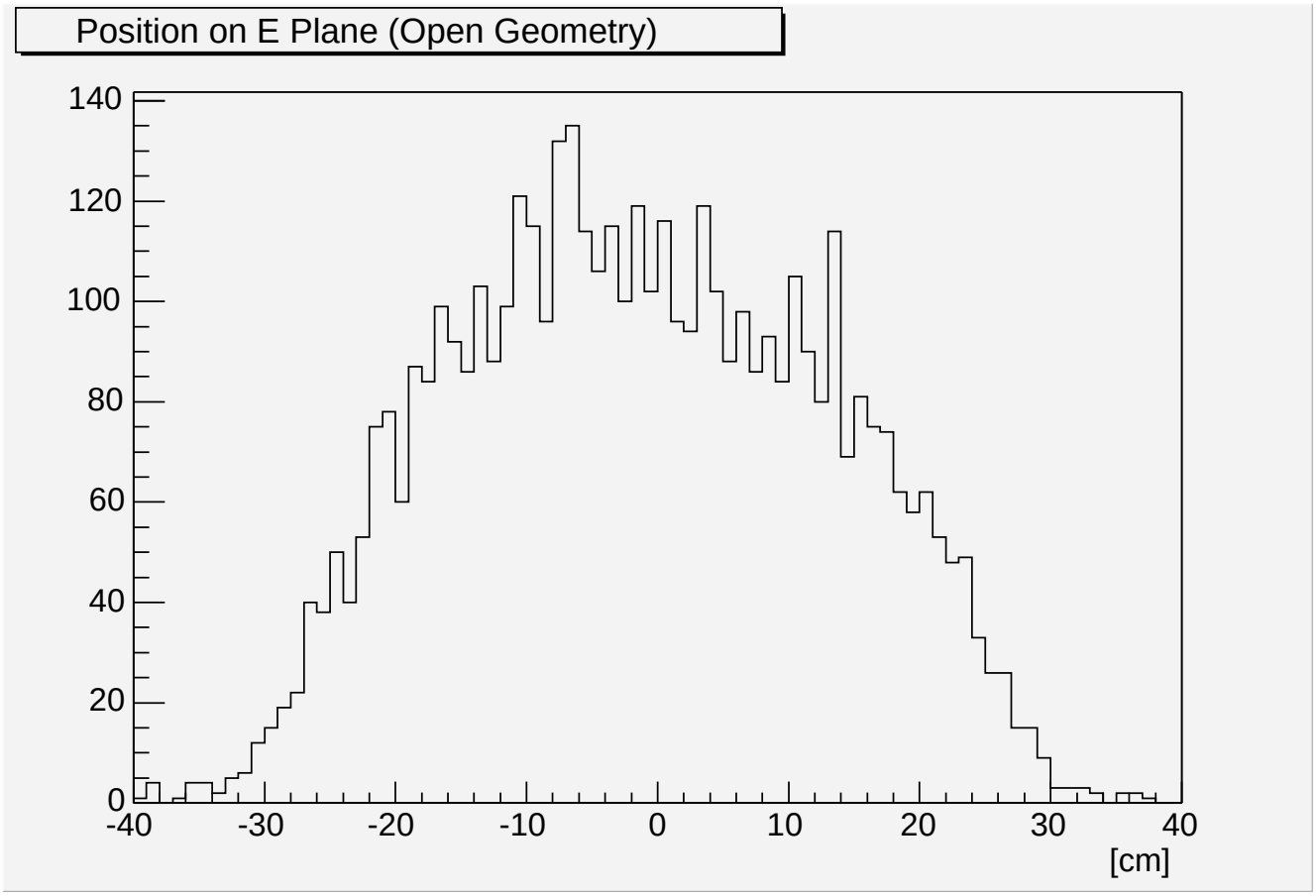
- Full system test in July 2003

ADC signals



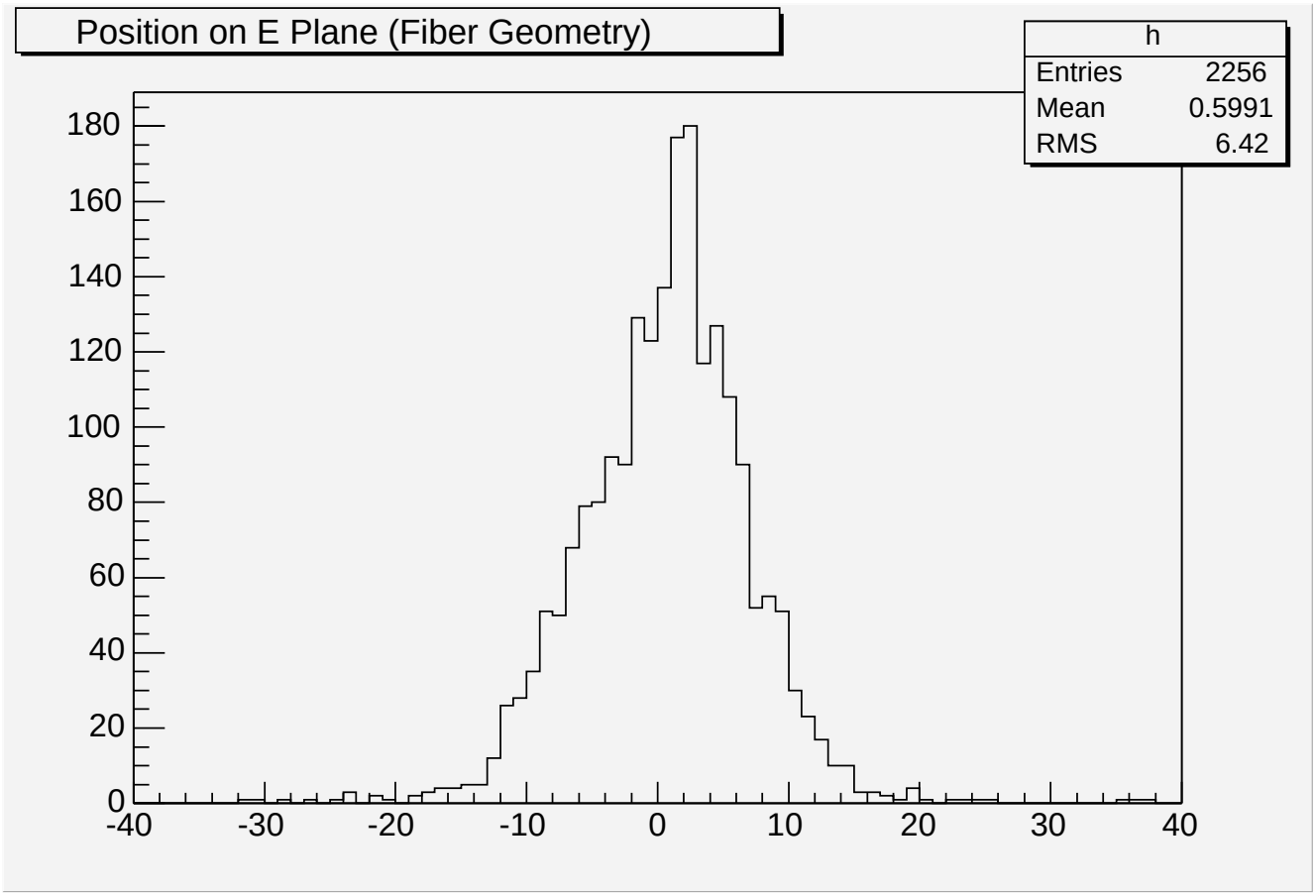
Transverse position

- 2 PMTs $\Rightarrow$ TDC Left $-$ TDC Right $=$ position
- Trigger is coincidence between E-plane, δ-E plane and auxiliary plane



Transverse position resolution

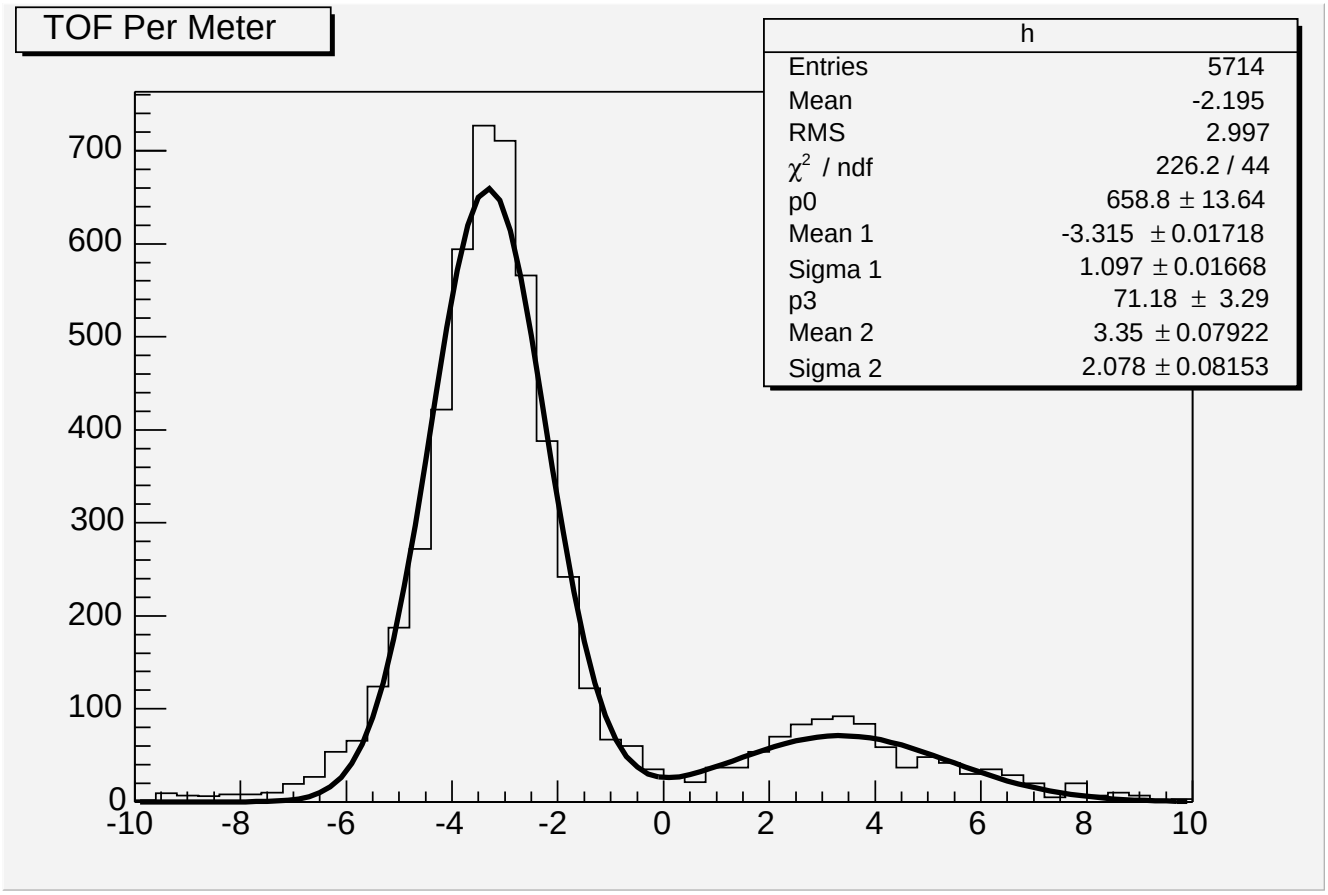
- Trigger on 2 cm-wide fiber scintillator installed accross the trigger plane, in coincidence with trigger plane



- Resolution of 6.4 cm

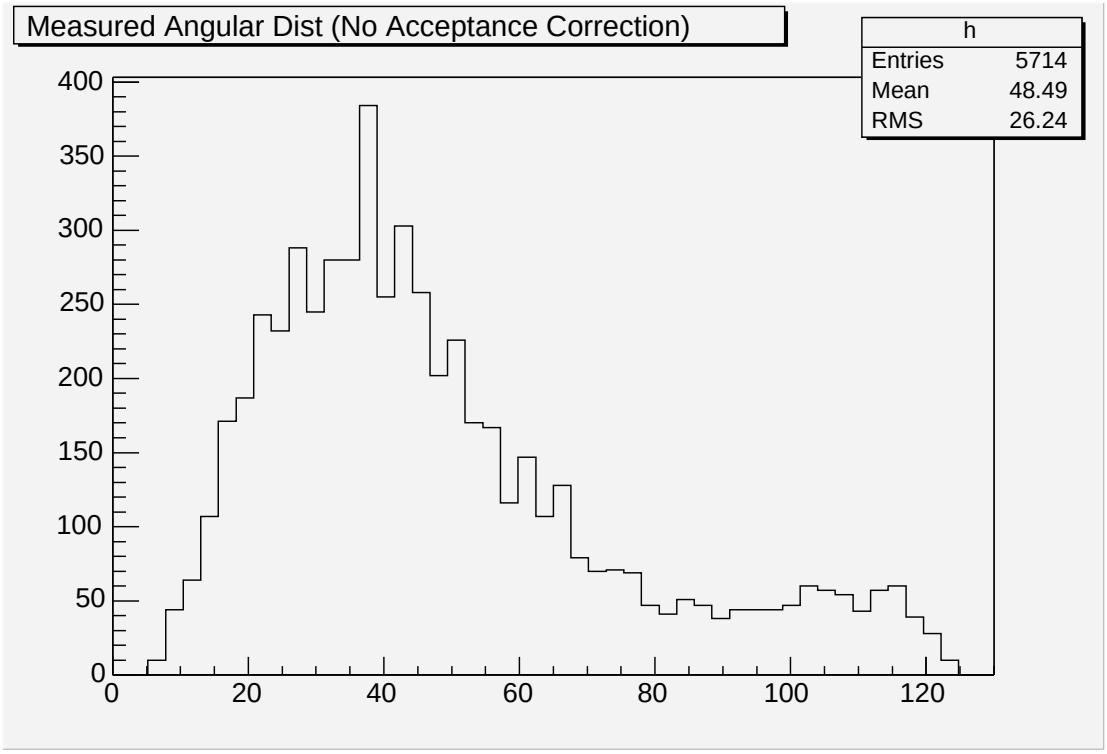
Time of flight

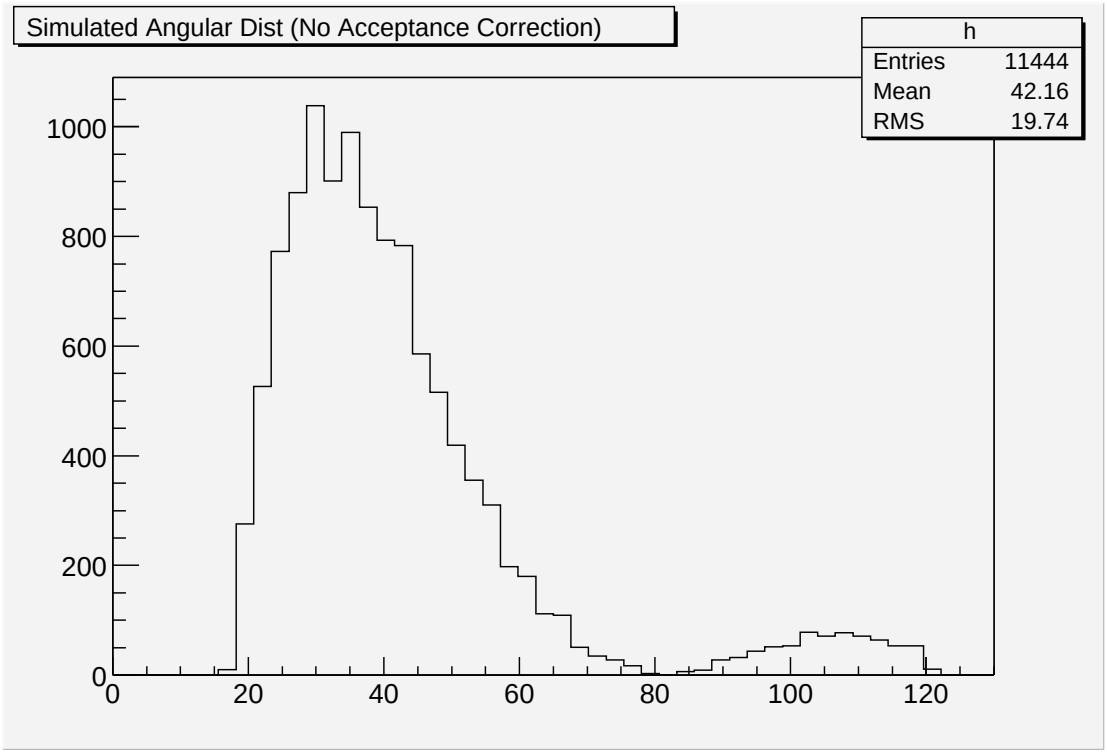
- Auxiliary time − Trigger time



- 2 peaks 6.6 ns/meter apart: comes from “forward” and “backward” cosmic rays

Angular distribution





Wire chambers

- Drift chamber

$\longrightarrow$ High resolution (G_E^n)

$\longrightarrow$ Extra thin chamber, for hadron detection

- 3 chambers
- Chambers 1 and 3: 2u, 2v, 2x planes, $\sim$ 200 μm res.
- Chamber 2: 1u, 1v plane, $\sim$ 1 cm res., for high rate and multitracks
- Chamber 1: 140 cm $\times$ 35 cm
- Chambers 2 and 3: 200 cm $\times$ 50 cm

Work in progress

- Assembly at UVa
- Wire stringing
- HV frame stretching
- Measurement of wire spacing (1 cm with 50 μm res.)
- Chamber 1: 5 out of 6 planes ready, chamber assembled, waiting for optimal Argon-based mixture of gas to test
- Start production of chambers 2 and 3, should be completed and tested by summer 04

BigBite detector configurations

- As proton detector:
  - ▷ E/δE trigger plane
  - ▷ wire chambers (except SRC)
- As electron detector:
  - ▷ E trigger plane
  - ▷ wire chambers (except SRC)
  - ▷ electromagnetic preshower and shower detector

$\Longrightarrow$ Need a frame that allows easy interchange of packages, leaving wire chambers in