Setup for measurements at GIF 2013/14

Demonstrator setup for fast MDT read-out

For first studies with real data a demonstrator setup has been designed

Properties:

- Fast read-out is implemented as TDC, 40 MHz clock \rightarrow resolution: $\frac{25ns}{\sqrt{12}}$ = 7.22 ns \rightarrow 229 μ m
- Fast read-out and normal read-out are used in parallel
- Fast read-out data has to be analyzed offline
- Fast read-out dead time: 2500 ns





Back side

Front side

CERN Gamma Irradiation Facility (GIF) - 2013/2014

Two experiments at once

- $\bullet\,$ Test of new read-out hardware (demonstrator setup) and fast tracking algorithm $\to MDT$
- $\bullet~$ Read-out with TRT electronics (shaping with baseline restoration) \rightarrow sMDT and MDT

Setup combines sMDT and MDT chamber

- MDT (30 mm):
 50 cm length, 24 cm width; 6 tube layers
- sMDT (15 mm):

100 cm length, 12 cm width; 8 tube layers

Test of new hardware and fast tracking algorithm

CERN Gamma Irradiation Facility (GIF) - 2013/2014

Goal: Measurement of efficiency and resolution





MDT chamber used for test 6 tube layers, 50 cm length

- $\bullet~$ No muon beam in the GIF \rightarrow use cosmic muons
- Fast read-out and normal read-out are triggered by scintillators
- Angle seed according to reference chamber: 4.7 mrad

Scintillators and trigger

- Scintillator sMDT: Size of sMDT chamber
- Scintillator MDT: Size of MDT chamber
- Scintillator Double:

Length of sMDT chamber, width of MDT chamber Read-out on both sides \rightarrow trigger time correction possible

Trigger:

 $sMDT \land Double \lor MDT \land Double$

