General Overview

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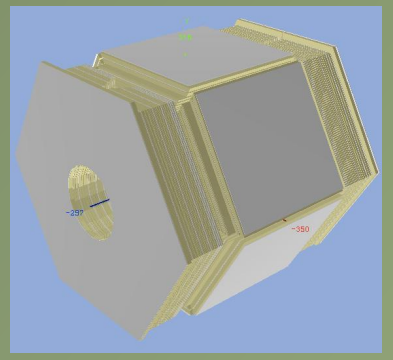
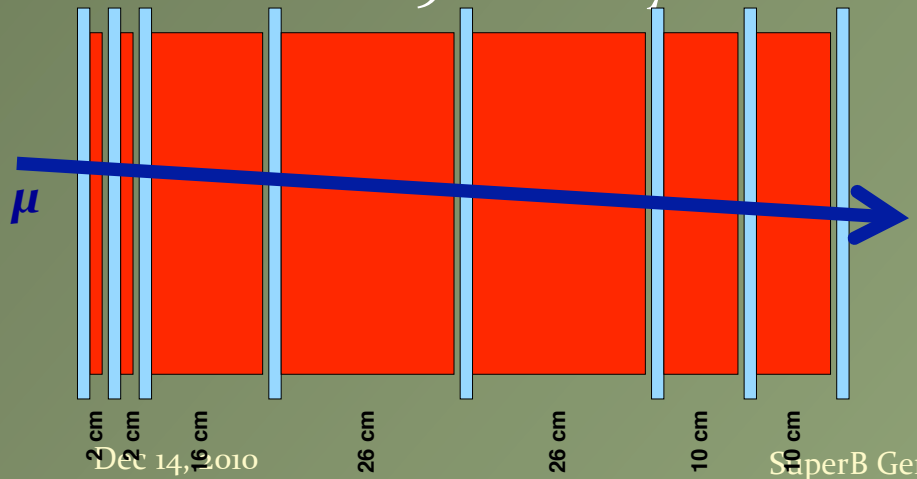
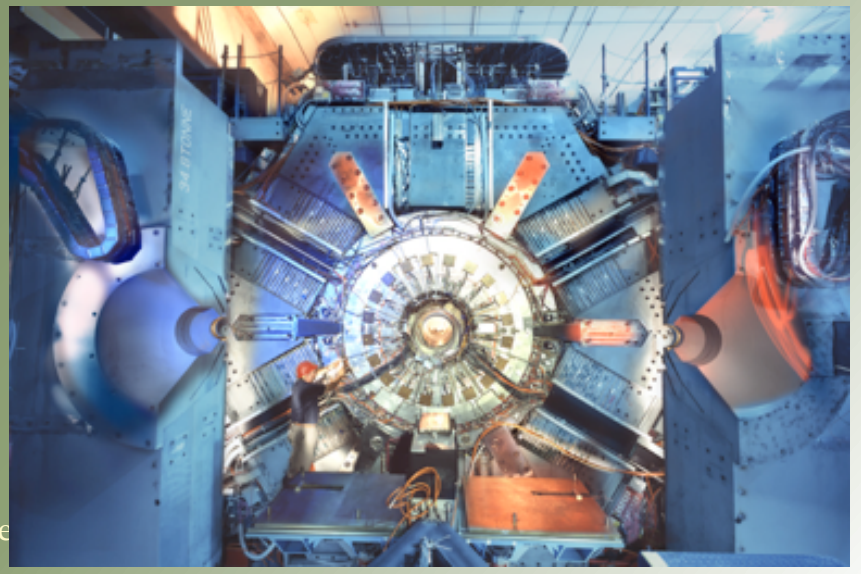
Introduction

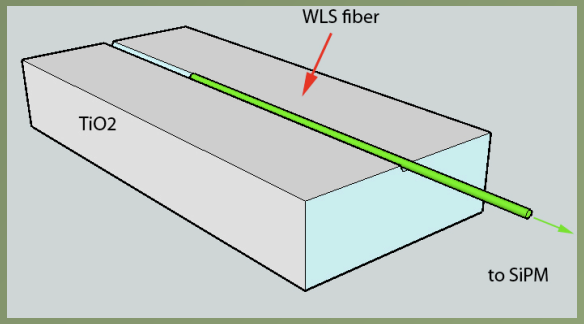


- Built in the magnet flux return, it will be composed by one hexagonal barrel and two endcaps
- Large active area
- Very high rates: hottest region up to few 100 Hz/cm^2
- Fine longitudinal segmentation in front of the stack for K_L ID capability (together with the electromagnetic calorimeter)
- Plan to reuse BaBar iron structure: some mechanical constraint (gap dimensions, amount of iron, accessibility, …)
- Use of 8-9 active layers

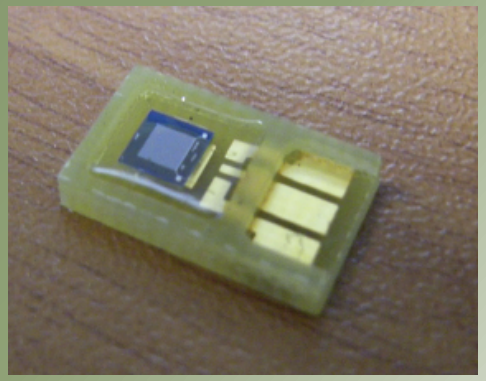




Detection technique

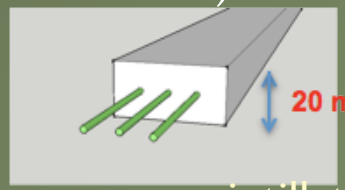


- Scintillator:
  - 2x4x400 cm^3 and 1x4x400 cm^3 scintillator bars
  - coated with TiO2
  - Light collection through WLS fibersFibers housed in embedded holes or grooves.
  - Made by FNAL NICADD facility.
- WLS fibers:
  - ϕ = 1.0 mm type Y11(300) (Kuraray)
  - ϕ =1.2mm type BCF92 (Saint Gobain)
  - Attenuation length $\lambda \approx 3.5$m
  - trapping efficiency $\varepsilon \approx 5.5\%$
- Photodetectors:
  - Silicon Photo Multiplier (FBK-IRST)
  - Gain $>10^5$
  - < 1ns risetime
  - Low bias voltage (≈35V)
  - Dark current rate @ room temperature, ≈MHz @ 1.5 phe, few 100kHz @ 2.5 phe, few 10KHz @ 3.5 p.e.

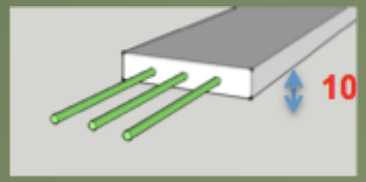


Timing and Binary readout

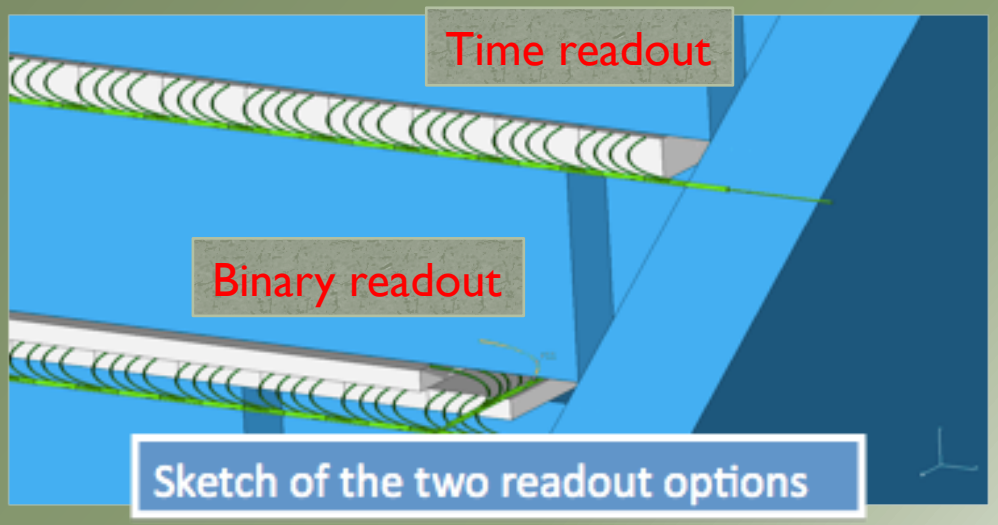
- Timing readout (Barrel): azimuthal coord ϕ measured from the hit bar, polar coord θ from the arrival time of the signal (read on both ends)



scintillator for Time Readout

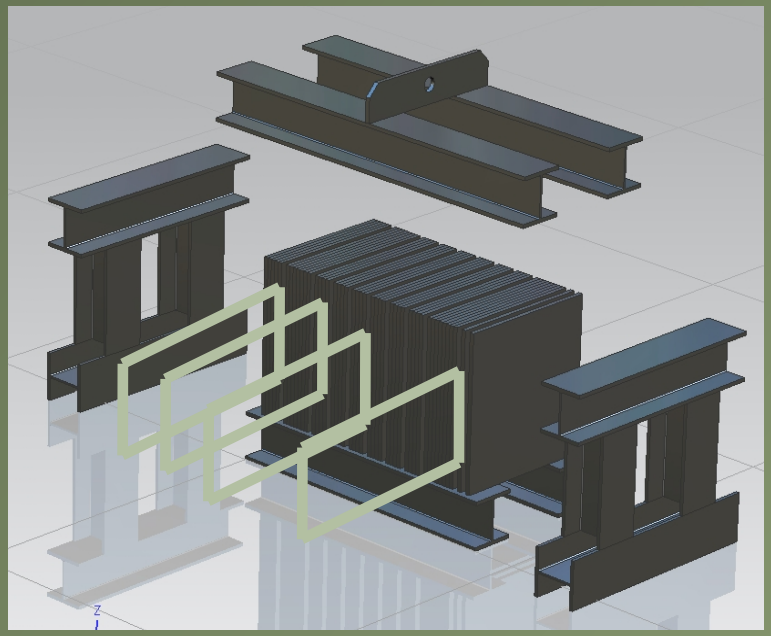


scintillator for Binary Readout



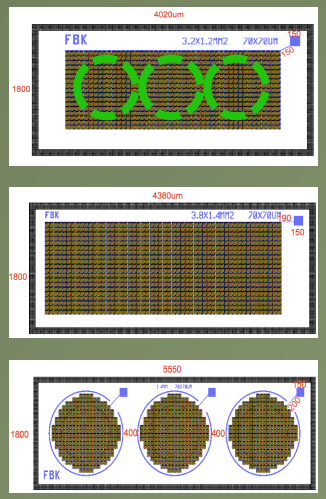
- Double coord binary readout (Endcaps): two layers of orthogonal scintillating bars provide directly the ϕ and θ coordinates (read each bar on one side only).

Prototype in a nutshell



- Iron: 60x60x92 cm^3 , 3cm gaps for the active layers

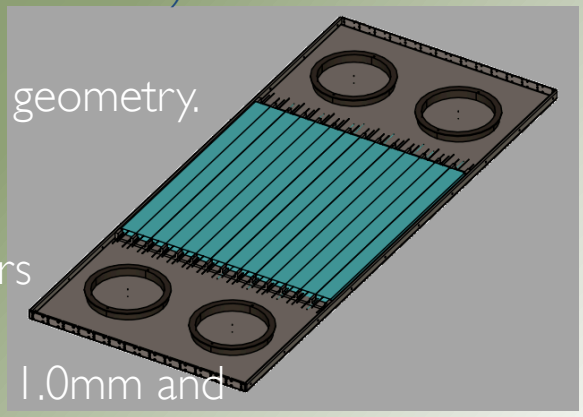
- Readout 9 active layers
  - 4 Layers Time readout (TDC-RO): 112 channels
  - 5 Layers Binary Readout (BiRo) 125 channels



Active layers housed in light tightened boxes (aka Pizza Box)

4 special modules to study different fibers or SiPM geometry.
Three types of SiPM with different geometry to be tested:

- 1.2x3.2 mm^2 to be coupled to 1.0mm fibers
- 1.4x3.8 mm^2 for 1.2mm fibers
- array of 3 round sensors: f=1.4mm for both 1.0mm and 1.2 mm fibers



Activities since last meeting

- In the last months main efforts on:
  - Beam test data analysis
  - Flux Return Mechanics
  - Background simulation
  - Cosmic run setup in Ferrara
  - Neutron irradiation test in Legnaro

Goal for this meeting (review)

- Review beam test data analysis results
  - detection performances
  - muon ID capability
  - other issues

- Review advancements and status of all other areas
  - Mechanics (flux return and detector)
  - Electronics
  - Background simulation
  - Overall detector design

Goal for this meeting (planning)

- What to do now
  - a complete analysis of the prototype data will few more months
  - in the meantime we have to plan the next beam test.
  - we have to fix/improve several things of the prototype and we have to perform cosmic ray tests.
  - develop our own TDC board (?).

- Not only prototype
  - iron optimization with simulation need to be finalized
  - KL studies should be done
  - Mechanics and electronics
  - Background analysis

- We need a careful planning of the activities for rest of the year

The path toward the TDR

- We have to provide a recommendation for the iron structure (based on prototype and simulation analysis, but with impact on mechanics and cost) – by the Elba meeting.

- We have to take some decision about the detector
  - scintillator bars, fibers, SiPM design
  - readout options
  - SiPM position

- We have to provide a complete description of the system in terms of
  - mechanics
  - electronics
  - performances
  - schedule, costs and manpower

Preparing the TDR

- TDR structure should be prepared now.
- For each section a responsible should be identified.
- By the Elba meeting each responsible should present the status of his section (in terms of missing information, work to be done, schedule and people involved).
- Next fall “internal reviews” of different sections should be done to finalize the work and prepare the TDR writing (figures needed, tables, etc…).

IFR sessions

Parallel 1 - IFR (15:00-15:00)

Conveners: Roberto Calabrese (FE)
Room: tbd

15:00-15:10 (00h10')	[66] **General Overview**	Gianluigi CIBINETTO (FE)
15:15-15:30 (00h15')	[67] **Prototype installation in Ferrara and plan for cosmic run**	Wander BALDINI (FE)
15:35-15:50 (00h15')	[68] **Test of neutron damage in Legnaro**	Flavio DAL CORSO (PD)
15:55-16:30 (00h35')	[69] **Discussion about plan for TDR**	

Parallel 2 - IFR (17:00-17:00)

Conveners: Roberto Calabrese (FE)
Room: Room Seminari, Bldg 36

17:00-17:20 (00h20')	[72] **Mechanics for the Flux Return**	Massimo BENETTONI (PD)
17:25-17:45 (00h20')	[74] **Plans for detector mechanics**	Vito CARASSITI (FE)
17:50-18:05 (00h15')	[76] **Update about IFR electronics**	Angelo COTTA RAMUSINO (FE)

Parallel 8 - IFR (17:00-17:00)		**Conveners:** Roberto Calabrese (FE) **Room:** Room Seminari, Bldg 36
17:00-17:20 (00h20')	[78] **Results from beam test: detector performances**	Gianluigi CIBINETTO (FE)
17:25-17:45 (00h20')	[79] **Results from beam test: reconstruction and muon identification**	Nicola GAGLIARDI (PD)
17:50-18:05 (00h15')	[80] **Update about background simulation**	Gianluigi CIBINETTO (FE)
18:10-18:30 (00h20')	[81] **Discussion about next beam test**	