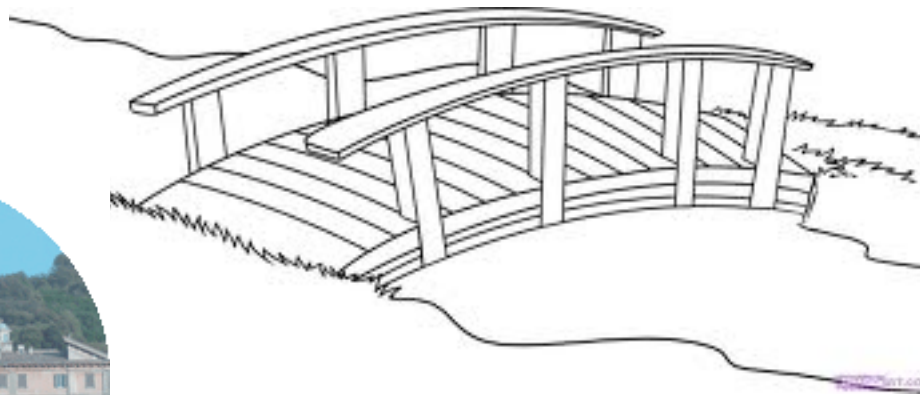




IFR general overview



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on behalf of the IFR group



LNF – Dec. 13-16 2011

Flux Return Mechanics

- After his visit to SLAC Massimo pointed out the need of a database to collect all the information about the flux return D&D.
- Federico during the same period measured the size of all the gaps of the barrel with a one-inch bar.
 - under this circumstance I suggested to explore the possibility to achieve the desired amount of iron filling the gaps with $\sim 25\text{mm}$ iron (brass or steel).
 - As pointed out by Massimo
 - we need better measurements.
 - in case of brass the cost wouldn't be as low.
 - 90 (or 92) cm of iron will be the maximum achievable.
 - On the other hand the advantage are clear.

Exploring a full BiRO readout

- As stated in Angelo's presentation at the ETD session and in my summary at the London meeting we studied the possibility to readout the barrel with a BiRO system dropping the TDC option.
- We had a meeting in Ferrara where we put the basis of the BiRO modules for the barrel; drawings are in preparation.
 - For each layer, two orthogonal plane of scintillators (5cm in ϕ , 10cm in z) will be placed inside the same mechanical structure.
 - The SiPM will be located at the end of the scintillator, inside the gap.
- This will be the baseline option for the TDR.
- No time readout → no need for FBK-SiPM, other solutions are back on discussion (more R&D needs to be done)

R & D results

- The Bologna group tested the light yield of the FNAL scintillators, with standard SiPM, our SiPM and MPPC, showing outstanding results for the scintillator-MPPC option even with one fiber.
- These results together with SiPM test from Krakow group make the SiPM choice less attractive.
- Angelo's tests with the ASICS readout also was not easy with the FBK SiPM.
- In addition the ITEP group proposed a different kind of scintillator that needs to be tested.

New beam test in Fermilab

- We had a new Fermilab test beam in October to partially recover the time loss in July.
- The main purpose of the test was to explore the low energy region and that was hard due to the beam line and some instrumentation not optimized for such low energies.
- Data have not been fully analyzed yet but we understood several issues present also in the previous test.
- A new beam test is scheduled for the end of February, and will be the last one, so a detailed data analysis, a careful design of the next test apparatus and a planning of the beam time usage must be done.

Data analysis and software update

- A major upgrade of the code has been done
 - several bug fixes
 - possibility to handle MC and test beam data
 - improved clusterization
 - improved MC reconstruction
 - prototype hybrid readout implemented
- Some improvements need to be finalized
 - Jarek visited Ferrara in November to join the team and he is now implementing his 2D clusterizer in the IFR code.
- Data analysis is ongoing.
- Also Fast Sim developments (see Marcello's talk at Physics Tools session).

Background simulation

- Much better understanding of the physics processes of background events.
- Complete background analysis (neutrons, photons, charged tracks) from different sources (i.e. rad bhabha, Touschek LER/HER, pairs).
- Absorbed dose on the frontend electronics.
- A background workshop has been encouraged in order to cross check the results and to work on possible remediation. Now it's official, the joint SuperB - Belle II meeting will be held in Wien next February.
- It's time to carefully review these results and plan the next steps.



Electronics and SiPM irradiation tests

- SiPM irradiation tests with neutrons have been done by the Padova group at LNL, results will be presented here.
- Angelo and Roberto took advantage of the LNL test to perform irradiation on the frontend electronics using Actel FPGA and an Orsay EASIROC board.
- New measurements on SiPM neutron irradiation and remediation are foreseen for the next year at the Gelina (Belgium) and ISIS (UK) facilities.
 - improved setup
 - different beams
 - there will be an informal meeting on Wed. to continue the planning of these activities.

TDR preparation status

- IFR sections and subsections structure has been prepared at the London meeting. Responsible people for each part has been identified.
- A first draft is expected by the end of the year and the full report few months later.
- The present IFR situation is the following:
 - latex structure of the chapter is in place
 - First draft of the introductory paragraph prepared [Roberto and Tadek].
 - background section is in good shape (some text and figures already produced). [Valentina]
 - description of the prototype and beam test setup and data taking has also been done.
 - Other parts maybe in good shape but just not included.
- Please send me your write up as soon as you have it.

Goal for this meeting

- Review advancements and results on different activities so far.
- Decouple the activities needed for the TDR and the ones with a larger time scale.
 - freeze the TDR detector design and circulate it.
 - give priority to the most urgent missing pieces (R&D on 10cm bars, detector optimization)
 - plan the long term activities (finalize the active module design, photodetector choice, background remediation, effect of background on reconstruction, fine optimization)

IFR sessions

- Tests on muon response with different Silicon Photomultipliers by Alessandro MONTANARI
- The IFR full BIRO layout by Wander BALDINI
- Flux Return design by Massimo BENETTONI
- Status of readout electronics by Angelo COTTA RAMUSINO
- SiPM irradiation tests at LNL by Flavio DAL CORSO
- The Beam Tests at Fermilab: present status and future plan by Wander BALDINI
- Beam test data analysis by Marcello ROTONDO
- Background simulation studies by Valentina SANTORO

Other IFR talks

- IFR Background report by Valentina SANTORO (FullSim & Backgroun – Thu 9AM)
- IFR frontend electronics by Angelo COTTA RAMUSINO (ETD – Thu 9AM)
- IFR development status and plans by Marcello ROTONDO (Physics Tools – Thu 11AM)