IFR mechanics
prototype and detector design

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Outline

• Prototype design
  – requirements
  – first sketches

• Detector design
  – baseline and open issues
  – detector drawings
Prototype requirements

• The prototype must have the same longitudinal segmentation of the real detector: i.e. the same amount of interaction length.
• We started with the TDR layout.
• We may want to test different configuration (add more iron): possibility to extend with more module/layer.
• The active area of each layer will be 40x40cm².
• The prototype needs to be orientated in 2 directions: vertical (for cosmics test) and horizontal (for beam test)
• It needs to be also moved transversally as respect to the beam line.
Prototype sketches (I)
Prototype sketches (II)

SCINTILLATORS
IRON
FIBERS
FRAME

superB workshop 16/02/2009  V. Carassiti - INFN FE
Detector design: the iron

- Much will depend on the possibility to reuse the BaBar flux return
- If we recycle the BaBar iron
  - A layer of scintillators can weight ~400kg (~10 times the weight of the old detector): need to understand the iron bending and redo structural calculations.
  - Some mechanical constraint and open issues: number of interaction length, possibility to add iron at the end...
- If not
  - design a brand new structure (everything to do)
  - less constraint
Detector design
scintillators weight & sagitta of the iron

<table>
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<th>LAYER N.</th>
<th>IRON WEIGHT (Kg)</th>
<th>SCINTILLATOR WEIGHT (Kg)</th>
<th>TOTAL WEIGHT (Kg)</th>
<th>Total W / Iron W</th>
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Detector design: the scintillators

• Some critical decision need to be taken:
  – Single or double view reading?
  – Where to put the photon detector? Inside or outside the gaps?

• Check/negotiate spaces and conduits with other detector and infrastructure
Detector design: general needs

• How to manage scintillators and fibers: modularity, routing of the fibers, toolings for the installation
• Detector assembly: scintillators and fibers on board the sextant before or after the installation?
• If iron not reused (building a new sextant): prebending the iron plates avoiding the sagitta do to the weight?
• The detector geometry will be optimized based on the simulation and beam test: the following are some very preliminary drawings
Detector drawings (I)

SCINTILLATORS

IRON

FRAME
Detector drawings (II)

SCINTILLATOR

FIBERS
Detector drawings (III)
Conclusions

• A super-B prototype is under study and construction

• The goal: find out the solution giving the best performances of the super-B detector