

## **CMS Upgrade MB Response to SLHC Proposal:**

### **07.15 Proposal for US CMS Pixel Mechanics R&D at Purdue & Fermilab -- D. Bortoletto & S. Kwan**

It is our intent to approve this proposal. Please see the comments from the referees.

Specific requests before final approval are:

1. Reevaluate the timescale to deliver a sound conceptual design, including sufficient feedback from the evaluation phase.
2. As a great deal is to be accomplished in a short time, explain more about the linkages between the various tasks in the project.
3. Explain the relation of this project to other pixel R&D in CMS and possibly ATLAS.

## **Proposal for US CMS Pixel Mechanics R&D at Purdue and Fermilab in FY08**

CMS ref: 07.15

Contact: D. Bortoletto, S Kwan

This could be specially relevant to the Phase I of the upgrade so should be high priority to obtain results.

Ref 1

Ref 2

Ref 3

Generally speaking I find the proposed subject very pertinent and quite to the point of where the efforts in mechanical engineering might be addressed to for an upgrade. It is certainly worth investigating in the proposed direction.

A few comments:

- With the allocated resources, two years might be a bit compact for an exhaustive programme with a sound conceptual design as the final deliverable (I mean by this something that can really serve as the basis to launch an engineering design). But I may be too pessimistic.
- In the schedule, the start of the final activity (i.e. the development of the conceptual design) should be better anticipated of – say – a Quarter: it is certainly true that possible design configurations must be guided by the (at least preliminary) results obtained in the Evaluation phases; but basic ideas and concepts of integrated design (which must also take into account different constraints from the ones targeted here) might and should also influence choices in the Evaluation phase.
- It is probably only a problem due to a fixed limit for the length of the document, but I miss the interconnection between the Work Packages: while the activities are presented as a sequence of steps a bit “closed” on each Work Package, it is clear that there must be a synergic effort of integration of the whole programme into a single project (a sort of “networking activity” with tasks clearly identified within the programme, so to speak). But it might well be that this is already quite clear to the proponents and they simply had no possibility to go into such a level of detail.
- Speaking about synergy, I am a bit astonished that the whole programme is centred just on the activities of the two labs concerned. I am not speaking about sharing of resources, but I would have expected to find mentioned tasks of connection and/or exchange of information and expertise with other labs having participated in the first round of the PIX@LHC adventure (one for all, PSI; but possibly also institutes from ATLAS?). Again, this is possibly just given for granted by the proponents.
- It might be useful to start from a detailed assessment of the performance of the present FPIX detector in terms of cooling efficiency and material budget (possibly compared to similar assessments for BPIX and/or the ATLAS “brothers”). And to start from this to fix an expected

(reachable) goal as a reference. This activity would probably not be part of the R&D programme and could be completed already in the second half of 2007: I guess a big effort in term of collection and compilation of the complete information is already ongoing in the interest of the CMS operation. So it would be just a side-task of data-mining, oriented to provide as much quantitative as possible information to guide the R&D efforts.