

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

### **08.03: Development of pixel and micro-strip sensors on radiation tolerant substrates for the tracker upgrade at SLHC CMS – M. de Palma**

It is our intent to recommend this proposal for approval. Please see the comments from the referees.

Specific requests before final approval are:

1. Explain the relation of this project to other tracker R&D in CMS and ATLAS and how common projects and collaboration might evolve, specifically with groups engaged in R&D on the same R&D questions and with the same companies.
2. Explain how DC coupling could ensure stable operation in a high-occupancy high-radiation environment.
3. Please provide information on the companies that would be qualified.
4. Please provide information on whether there are any other data besides that from RD-50 demonstrating the superior radiation tolerance of p-type MCz.
5. Please comment on the increase of the capacitive load on the FE chip (causing an increase in power consumption) from use of the double-metal routing.
6. Please provide more details about the use of vertical 3D integration.
7. Please explain how the proposed design would cope with the FE chip connection to the sensor leakage current that will increase with the radiation dose expected.
8. Please comment on the possibility of comparing n-type and p-type FZ sensors as part of the submission program.
9. Please comment on the serial nature of the schedule and contingency allocation for failures as well as comparing the proposal schedule with the schedule experience of the present CMS tracker.
10. How much is the schedule impacted by the potential funding profile?
11. Please provide some information on the breakdown of the FTE sums into individuals.