

Meeting Minutes of the 53rd FCC-ee MDI meeting

Indico: <https://indico.cern.ch/event/1394606/>

When: 08.04.2024 16:00-18:00 CET

Agenda

Presenter	Title
M. Boscolo	Introduction, General News
A. Ilg	Toward a curved vertex detector for FCC-ee
F. Franesini	Progress on the IR vacuum chambers design and their cooling system

1 M. Boscolo - Introduction, General News

Following the accelerated schedule of the ESPPU decided by the March CERN Council, the new deadline for the FS final report is 31 March 2025. The topics for a first draft for the MDI note are discussed, should tentatively be ready by the end of July 2024 starting from the mid-term note.

Good attendance at the Second Annual US FCC Workshop (MIT, Boston). US national labs have significant capabilities on IR/MDI design, fabrication, alignment, magnet testing and measurements Interest also on vertex detector design, and beam backgrounds simulations.

2 A. Ilg - Toward a curved vertex detector for FCC-ee

The possibility of implementing for IDEA a sensor-only vertex detector based on ALICE ITS3 Monolithic Active Pixel Sensors (MAPS) is explored. Material budget of classic IDEA vertex detector is 0.3% per layer (CDR assumption). the use of wafer-scale bent sensors would reduce this contribution down to 0.05%.

First curved vertex detector concept implemented in DD4hep. Due to sensor dimensions and different requirements from the experiment w.r.t. ITS3 (services, forward coverage, gaps) a first redesign of the vertex detector was necessary. Main changes are the addition of a fourth layer and the possibility to twist the cylindrical sensors to reduce dead space.

M. Koratzinos asks about the alignment strategy for such a thin detector. **F. Palla** comments that this and other criticalities needs to be discussed with the ALICE ITS3 group.

M. Koratzinos asks about the potential stress induced by the twisting of the sensors suggested to reduce gaps. **F. Palla** answers that it should be mechanically feasible.

N. Bacchetta asks how is the first layer supported. **F. Palla** answers that it is supported by the longeron, which in turns is supported by the second layer and so on. **A. Ilg** adds that it is not supported by the beam pipe because of thermal and electrical insulation. **C. Niebuhr** comments that the Belle2 vertex detector is

attached to the pipe and they are sensitive to the thermal deformation of the beam pipe. **M. Boscolo** comments that if bakeout will be done also in the IR, the thermal response of the detector should be considered. **C. Niebuhr** adds that at SuperKEKB bakeout is done only in the arcs, not in the IR.

3 F. Franesini - Progress on the IR vacuum chambers design and their cooling system

The cooling manifolds of the IR beam pipe have been redesigned using AlBeMet162 instead of copper, after first LumiCal simulations showing heavy noise coming from secondaries produced on the copper sections. Changing material implies new design considerations, as the cooling channels need to be machined on the chamber and standard inlet/outlet connections must be used. Optimization of the design is still ongoing.

M. Koratzinos asks why not going with the "sandwich" system for the cooling of the ellipto-conical chamber. **F. Franesini** answers that the pressure drop on one meter with that design would be too much, and also it would be difficult to realize a connection for the coolant.

28 Participants:

K. André, N. Bacchetta, K. Bisgaard, M. Boscolo, H. Burkhardt, P. Burrows, A. Ciarma, C. Eriksson, F. Franesini, B. Francois, A. Frasca, A. Ilg, P. Janot, M. Koratzinos, S. Lauciani, A. Lechner, M. Marchand, C. Niebuhr, A. Novokhatski, K. Ohmi, K. Oide, F. Palla, B. Parker, F. Poirier, J. Salvesen, J. Smiesko, L. Watrelot, and F. Zimmermann

Minutes prepared by A. Ciarma