

# Meeting Minutes of the 43<sup>th</sup> FCC-ee MDI meeting joint with Detector Concepts

Indico: <https://indico.cern.ch/event/1241377/>  
When: 06.02.2023 16:00-18:00 CET

## Agenda

Presenter	Title
<b>M. Boscolo</b>	Minutes, general information
<b>C. Eriksson</b>	Magnet Design for Beamstrahlung Photons Extraction Line
<b>F. Franesini, S. Lauciani</b>	Update on the MDI Mechanical model
<b>F. Palla</b>	Vertex & Outer Tracker Integration in the MDI
<b>M. Boscolo</b>	Highlights from the 6th FCC Physics Workshop

### 1. Minutes, general information – M. Boscolo

Minutes from last meeting are discussed and approved.

The next session of the MDI meeting is planned for Monday 20.02.2023 at 16:00 CET to discuss progresses on the collimation and background studies.

### 2. Magnet Design for Beamstrahlung Photons Extraction Line – C. Eriksson

Carl presents a study on the magnet design for the BS photons extraction line, from about 60 to 150 m downstream the IP. The investigation is for the required cross-section of the dipole and quadrupole magnets. The result of the study is that there is no major showstopper, and it is possible to design the magnets for the extraction of the photons.

**A. Foussat** asks how the beamstrahlung solid angle is defined. **C. Eriksson** comments that 8 sigmas of the photon beam divergence have been used. **J. Bauche** adds that also the electron envelop and the dimension of the beam pipe have been taken into account to establish where the photons can be considered separated. **A. Ciarma** agrees and adds that it is important to extract this very intense radiation in order to avoid power deposition on the magnets and secondaries production near the IPs.

**J. Bauche** asks if it is possible to start to use a standardization of the magnets dimension in the next iteration of the lattice. **K. Oide** comments that up to now these dimensions have been treated simply as variables, but a first approach can be done.

**A. Ciarma** comments that it is important to evaluate the impact on the impedance coming from the enlargement of the beam pipe. **M. Boscolo** adds that the design of the beam pipe in that region will come after. **J. Bauche** agrees and adds that as soon as the photon and electron beams are separated, a window can be done to separate the vacuum chambers.

### **3. Update on the MDI Mechanical Model – F. Franesini, S. Lauciani**

An update on the Lumical integration and support is presented which no longer requires the division in half of the detector, by slightly modifying its dimensions in the downstream section.

New calculations on the structural analysis and assembly and insertion strategy of the carbon fiber support tube are shown.

New proposal to use two slightly different bellows with respect to the IP is discussed, following what was presented in Krakow.

**M. Dam** comments that it is important to simulate the effect of such modification in the LumiCal to verify efficiency and angular acceptance for the Bhabhas. **F. Palla** adds that from very first estimates the leakage with the modification accounts for ~1% of the total energy.

**M. Dam** asks if the new proposed support is enough to fully support the Lumical. **S. Lauciani** confirms and adds that with this system an alignment precision at the micron level is possible. **M. Boscolo** adds that this support may have an impact on the material budget on the downstream detectors.

**F. Palla** comments on the shape of the rails, which should be conical instead of linear.

**M. Dam** asks why not make the support tube longer in order to attach it to the eCal. **S. Lauciani** comments that the tube in principle could be longer. **F. Franesini** adds that the support tube for now is attached to the (IDEA) drift chamber, but eventually the design of the tube depends on the detector design.

**A. Novokhatski** asks about the cooling system of the bellows, as by experience of many machines there has always been problem with heating. **S. Lauciani** answers that for the moment it does not exist as we wait for the evaluation of the heat load, but it may be added.

### **4. Vertex & Outer Tracker Integration in the MDI – F. Palla**

The feasibility study of the IDEA vertex and tracker integration is presented. An intermediate barrel layer in the tracker has been added to improve track

reconstruction ( $p_T > 45 \text{ MeV}$ ). An upgrade to avoid overlaps on the beam pipe and improve integration has been produced.

## 5. Highlights from the 6<sup>th</sup> FCC Physics Workshop – M. Boscolo

A summary of the two MDI session held at the last FCC Physics workshop is presented.

### Action items:

- Need to evaluate heat load in the area close to the SC sextupoles
- Request by Jeremie: Is it possible to standardize the magnet length and cross-section as much as possible?
- Support tube length to be defined with the detector group
- Detector stray field and booster tolerability
- Perform simulations to estimate the effect of the discussed modifications on the Lumical

### Participants

M. Boscolo, A. Ciarma, A. Ilg, A. Lechner, A. P. Foussat, C. J. Eriksson, E. Di Pasquale, E. Perez, F. Palla, F. Valchkova, F. Poirier, H. Burkhardt, J. Bauche, K. Oide, L. Watrelot, M. Dam, A. Novokhatski, S. Lauciani, F. Fransesini, B. Parker, P. Burrows, E. Montbarbon, F. Sekfow, J. Grenard, L. Pellegrino, K. Andre, M. Sullivan, G. Ganis,

Minutes prepared by A. Ciarma  
(Please note the unusual date!) Next meeting will be on 20/02/2023