
Meeting Minutes of the 44th FCC-ee MDI meeting

Indico: <https://indico.cern.ch/event/1251507>

When: 20.02.2023 16:00-18:00 CET

Agenda

Presenter	Title
M. Boscolo	General informations, News
P. Raimondi	Possible study on the detector solenoid compensation scheme
K. André	Synchrotron Radiation background
A. Abramov	FCC-ee IR beam losses
A. Ciarma	Detector backgrounds
A. Lechner	Plans for Radiation Studies with FLUKA for the FCC-ee MDI

1 M. Boscolo - General informations, News

A short summary from Krakow on the background studies is presented.

2 P. Raimondi - Possible study on the detector solenoid compensation scheme

A novel compensation scheme to decrease emittance growth and vertical dispersion generated in the IP area is proposed. It makes use of skew quads and weak dipoles to move far from the IPs the counter-solenoids (ideally anywhere before the first dipole) – a' la Dafne. Leaking dispersion is canceled by antisymmetric skews.

P. Janot asks if this would leave space to the LumiCal. **P. Raimondi** says that this is not straightforward to say yes or no, as the steers would need to start as soon as possible. This needs to be studied.

K. Oide comments that the chromatic coupling can be addressed properly only by counter solenoids, not by only skew quadrupoles. **P. Raimondi** replies that maybe a solution with both steers for orbit and anti-solenoids for Synchrotron Radiation can be figured out (e.g. maintain the screening solenoid and remove the compensating solenoid in favor of the steers).

3 K. André - Synchrotron Radiation background

An update on the SR power deposition description and collimators is given with the improved geometry model and field map. Also the effect on SR background due to off-axis top-up beam injection is shown. From preliminary studies it emerges that O(J) energy is deposited in the IR. An unexpected positron signature at the IP is not well understood and needs further study. A first study on the SR in the HFD lattice is presented.

4 A. Abramov - FCC-ee IR beam losses

An overview of the collimation studies at FCC-ee is presented. The beam loss sources and the collimation simulation setup are described.

K. Oide comments that the tapering shown is not optimal (e.g. should be asymmetric). **A. Abramov** answers that this is true, and this simple approach is just used temporarily before more dedicated studies are performed.

A. Perrillo asks where the rest of the 60kW of lost power impings (only few Watts hit the IR). **A. Abramov** answers that it is deposited either on the collimators located on PF or directly on the aperture.

A. Perrillo asks the material of the secondary and SR collimators. **A. Abramov** answers that secondary collimators are made of Grafite (like the primary) while SR collimators are made of Tungsten.

A. Lechner asks if it is reasonable to expect a 5 minutes lifetime from off-momentum losses. **A. Abramov** answers that 5 minutes is the design criteria. **H. Burkhardt** adds that fast losses can exist, but from the LEP experience the cause was usually betatron oscillation.

5 A. Ciarma - Detector backgrounds

A short summary of the status and perspective of the MDI background studies is presented. To proceed on the design of the beamstrahlung dump and extraction line it is important to evaluate all the photon sources emitting downstream. First results show that SR coming from the solenoid account for about 20% of the power.

A. Marcone asks if the radiation coming from all the sources arrives simultaneously. **A. Ciarma** answers yes, as they are produced at the passage of the beam, so the total power is given by the sum of all the radiation sources.

M. Dam asks if also the SR coming from the anti-solenoids is included in the estimate. **A. Ciarma** and **K. André** confirm this.

A. Lechner comments that having these numbers is important, and suggests that these and other specifications could be formalised in a document.

6 A. Lechner - Plans for Radiation Studies with FLUKA for the FCC-ee MDI

A Ph.D. student will join the FLUKA team (SY/STI/BMI) to perform radiation studies in the FCC-ee MDI model. The planned studies include the calculation of the secondary radiation fields in the IS tunnel up to the arc and radiation studies for the beamstrahlung photon dump.

Follow-up items

TASK
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37 Participants:

A. Abramov, K. André, P. Azzi, N. Bacchetta, F. Bedeschi, M. Boscolo, G. Broggi, H. Burkhardt, P. Burrows, M. Calviani, A. Ciarma, M. Dam, A. Di Domenico, C. Eriksson, F. Francesini, B. Francois, G. Ganis, M. Hofer, A. Ilg, P. Janot, R. Kersevan, M. Koratzinos, A. Lechner, H. Nakayama, C. Niebuhr, A. Novokhatski, K. Oide, S. Ozdemir, B. Parker, E. Perez, A. Perrillo-Marccone, F. Poirier, P. Raimondi, D. Shatilov, J. Smiesko, M. Sullivan, and L. Watrelot

Minutes prepared by A. Ciarma