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Interaction region design of the future circular Collider FCC-ee

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We present the latest development for the FCC-ee interaction region and machine-detector interface (MDI). It represents a major challenge for the FCC-ee colliders, which has to achieve extremely high luminosity over a wide range of centre-of-mass energies. FCC-ee will host two or four high-precision experiments. The machine parameters have to be well controlled and the design of the machine-detector-interface has to be carefully optimized. In particular, the complex final focus hosted in the detector region has to be carefully designed, with compensating solenoids and the first final focus quadrupole inside the detector; the impact of beam losses and of any type of synchrotron radiation generated in the interaction region, including beamstrahlung, have to be simulated in detail. We discuss mitigation measures and the expected impact of beam losses and radiation on the detector background. We also report the progress of the mechanical model of the interaction region layout, including the engineering design of the central beampipe, the vertex detector which has been recently designed and integrated with the machine components, and the luminosity calorimeter.

Primary author: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Presenter: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

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