

Studies of the Beam backgrounds at the CEPC

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The Circular Electron Positron Collider (CEPC) has been proposed for Higgs and electroweak measurements with unprecedented precision. To achieve the required performance precision, it is critical to understand, characterize and then mitigate the beam backgrounds that are critical for the machine and detector design and operation.

In this talk, we will present the latest studies of the beam backgrounds originating from multiple sources, covering the main contributions from synchrotron radiation, pair production and off-momentum beam particles. Based on the design parameters presented in the CEPC Conceptual Design Report (CDR), we have performed detailed simulation of these backgrounds, following the steps of event generation, detector simulation and background quantification. We have used hit density, total ionization dose (TID) and non-ionization energy loss (NIEL) to quantify the background levels and evaluated the impacts on the vertex detector that will be located closest to the interaction point and thus most vulnerable to backgrounds. We have also introduced several mitigation measures to reduce the backgrounds and evaluated their effectiveness accordingly. In addition, we will discuss possible improvements in background modeling and optimization of the interaction region in future studies.

I read the instructions

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