

Simulation studies of beam-induced backgrounds for calorimeter

The technical design report of the CEPC reference detector is currently being compiled, in which the calorimeter section has selected the long crystal bar electromagnetic calorimeter and the scintillating glass hadron calorimeter as the baseline scheme. In order to study the impact and challenges of beam background on the performance of the existing detector design, we have developed a mixed algorithm for beam background with time in CEPCSW, as well as precise geometric material description and digitization algorithms for the calorimeter. To study signal pile-up, we have also developed waveform simulation algorithms. Based on these tools, we have conducted research on the impact of beam background on the counting rate, radiation effects, signal pile-up, and energy resolution of the calorimeter, making preliminary progress. These results will provide important input for the design and optimization of the MDI and calorimeter.

Primary authors: SONG, Weizheng (Institution of High Energy Physics); GUO, Fangyi; SHI, Haoyu (IHEP); SUN, Sheng-Sen (Institute of High Energy Physics)

Presenter: SONG, Weizheng (Institution of High Energy Physics)

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