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Early results for the phase 1 of BEAST-II experiment at SuperKEKB

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The Beast-II experiment aims to measure machine-induced backgrounds during commissioning of the SuperKEKB accelerator. The physical processes behind such backgrounds are notoriously difficult to simulate, hence the importance of conducting experimental validation as early as possible during the commissioning process. These results are critical to be able to predict the physics performance and lifetime of sensitive components of the Belle-II detector.

This presentation gives a brief overview of the BEAST-II detector, with focus on the crystal calorimeter system. The data-taking campaign can be split in two broad classes of measurements. The first consists of continuously recording data to study the long-term time structure of the backgrounds following dynamic pressure and vacuum scrubbing effects. The second class of measurements consists of dedicated “beam study” runs that artificially enhances specific contributions in order to disentangle the main background mechanisms and study their scaling with beam parameters.

The recorded data span from early February 2016 to the end of June 2016. The crystal calorimeter system was able to observe a broad range of background-related phenomena despite suffering notable radiation damage. The first comparisons of measured and simulation backgrounds are presented, together with first measurements of the injection background and an empirical description of the vacuum scrubbing process and the time structure of so-called “beam-dust” events.

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