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The Belle II / SuperKEKB Commissioning Detector - Results from the First Commissioning Phase

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The SuperKEKB energy-asymmetric e+e- collider has now started commissioning and is working towards its design luminosity of 8x10ˆ35cm-2s-1. In spring 2016, SuperKEKB circulated beams in both rings during the first phase of commissioning, with the Belle II detector at the roll-out position. A dedicated array of sensors collectively called BEAST II was installed around the SuperKEKB interaction point to monitor and study beam background conditions. These measurements determine particle loss rates contributing to the beam life time, expected dose rates and thus possible effects on the survival time of the inner detectors, and both beam and physics background-induced particle rates, which impact detector operation and physics analysis. We will discuss the BEAST II setup, consisting of a total of seven different detector systems, each specialized for the measurement of different aspects of the beam background. We will present results on beam background for different accelerator conditions and studies of the injection background originating from the continuous ‘‘top up’’ injection of SuperKEKB. An outlook for the second phase of the commissioning, where data will be taken with the Belle II detector with a modified inner detector system specialized for background measurements, partially derived from the first phase of BEAST II, will also be given.

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