

CLAWS - A Plastic Scintillator / SiPM based Detector measuring Backgrounds during the Commissioning of SuperKEKB

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The SuperKEKB collider at KEK, which has started its commissioning in February 2016, is designed to achieve unprecedented luminosities, with a factor 40 higher than the record-breaking luminosity of the KEKB machine. For the operation of the Belle II detector, in particular of its pixel vertex detector, a precise understanding of the background conditions at the interaction point is crucial. To study backgrounds, a dedicated detector setup consisting of different subsystems has been installed for the first commissioning phase of the accelerator. Among those systems is CLAWS, consisting of 8 scintillator tiles with directly coupled SiPMs, read out by computer-controlled oscilloscopes with very deep buffers. CLAWS focuses on the background connected to the continuous injection of the accelerator, by monitoring the background levels of individual particle bunches in the machine with sub-nanosecond resolution continuously over ms time-frames. We will present the technology of the CLAWS detectors, the overall installation and the detector performance including the calibration, time resolution and observed effects from the moderate radiation dose received during operation. We will also discuss selected results on the time structure of the injection background during the first phase of SuperKEKB, and present the plans for an upgraded system to be installed as part of the Belle II inner detector for the second commissioning phase scheduled for spring 2018.

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