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The Belle II diamond-detector for radiation monitoring and beam abort

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The SuperKEKB electron-positron collider at the KEK laboratory in Japan aims to achieve a maximum luminosity 50x higher than its predecessors KEKB and PEPII, positioning the Belle II experiment at the forefront of searches for non-standard-model physics in the next decade. High collision intensity implies high beam-induced radiation, which can damage essential Belle II sub-detectors and SuperKEKB components. Twenty-eight diamond sensors, read-out by purpose-built electronics, are installed on the beam-pipe to measure radiation and prevent damage. The sensors operate as solid-state ionization chambers, providing measurements of pA to mA currents, which are proportional to the radiation-dose rates, to monitor instantaneous radiation, record integrated radiation, and trigger beam aborts. This talk introduces the system features and discusses in detail the 2018-2019 operations and performance in early Belle II data taking.

Secondary track (number)

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