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Upgrade of beam abort system at the SuperKEKB positron ring

Thursday 5 June 2025 15:30 (2 hours)

We upgraded the beam abort system at the SuperKEKB positron ring to speed up the abort response and mitigate the damage caused by Sudden Beam Loss (SBL). An SBL event can result in the loss of tens of percent of the beam current within one or two turns. The huge radiation accompanying the beam loss can severely damage accelerator hardware and the detectors at the interaction point. The fast-response abort sensors based on the plastic scintillator and SiPM were installed to detect the beam loss from SBL earlier. Besides, the configuration of the abort trigger system (interlock) network was customized to shorten its response. The upgrade work was conducted in the 2022-2024 long shutdown and the 2024 summer shutdown. It was implemented in the beam operation in 2024. After this upgrade, we could throw abnormal beams more than one turn earlier. It is a significant treatment against SBL. We report the details of the upgrade and the improved performance achieved in the 2024 operation.

Footnotes

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Region represented

Asia

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