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Study on a novel laser fast abort system for SuperKEKB

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To ensure stable and continuous commissioning of SuperKEKB, the machine protection system (MPS) plays a crucial role in safeguarding the accelerator's hardware from damage caused by beam loss. The response time of the MPS is a critical factor in mitigating hardware damage caused by the radiation of abnormal beams. In this study, we investigate a novel laser fast abort system for the SuperKEKB accelerator to reduce the response time of the beam abort trigger. The laser, serving as the trigger signal, is transmitted through free space. Compared to the traditional method, the transmission speed is 1.5 times faster than that in optical fiber. This faster signal transmission can shorten the abort time, enabling the realization of effective MPS. The optical design for long-distance laser beam propagation and measurement of coupled laser power have been studied. Investigation will be conducted regarding the long-term stability of the laser beam inside the accelerator tunnel.

Footnotes

Paper preparation format

LaTeX

Region represented

Asia

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