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A kick-and-cancel injection scheme for Diamond-II

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The Diamond-II storage ring upgrade will provide users with 1-2 orders of magnitude brightness increase over the existing Diamond facility, for which a quasi-transparent top-up injection scheme will be a key performance requirement [1]. The ring was originally designed to use a single-bunch aperture sharing injection scheme [2], in which short stripline kickers are used to kick the injected bunch into the storage ring's dynamic aperture but remaining weak enough to avoid kicking the stored bunch outside the acceptance. A modification to this scheme which implements a kick-and-cancel method [3] shows promise for the stored bunch. The kicker power supplies are thus required to provide a double-pulse with few-microsecond pulse spacing. This new method is expected to significantly improve the transparency and reduce the recovery time for the targeted bunch, along with minimizing transverse wakefield effects and any interactions with the transverse multibunch feedback.

Footnotes

[1] R.P. Walker, et al., Diamond-II Technical Design Report, Aug 2022.

[2] J. Kallestrup et al. In proc. IPAC'22, THPOPT018, May 2022.

[3] C. Sun et al., Phys. Rev. Lett. 109, 264801, Dec 2012.

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