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Bunch lifetime analysis based on the injection interval at SuperKEKB

Monday, 8 May 2023 16:30 (2 hours)

We carried out the study of the beam lifetime at SuperKEKB to investigate beam instabilities. We analyzed the injection interval for individual bunches to evaluate their beam lifetime ratio. SuperKEKB performed the top-up operation with the equalized bunches currents. This particular condition enables us to evaluate the lifetime ratio among all operation bunches. This report introduces the analysis results for the 2020 and 2021 data. We observed the beam lifetime has dependent on the bunch spacing and the relative position in the bunch train. Besides, in the December 2021 data, we determined the magnitude of the forward/backward asymmetry of the lifetime in the bunch train depends on the bunch current. They become good hints to understand the beam instabilities such as the electron cloud, the ion cloud, the beam-beam
effect in the collision, and so on.

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Footnotes

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Yes

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