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Modification of beam transport line design for simultaneous top-up injection to PF and PF-AR

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KEK has two light sources: Photon Factory (PF, 2.5 GeV) and Photon Factory Advanced Ring (PF-AR, 6.5 GeV). In 2017, the use of a new beam transport line (BT) of PF-AR was started, and the simultaneous top-up injection for both PF and PF-AR was realized. These days, there have been strong demands for the reduction of the operating cost of accelerators, and its importance is greater in PF-AR with higher ring-energy. In 2019, the 5 GeV operation was started in PF-AR. However, the new BT of PF-AR (ARBT) was designed for the energy of 6.5 GeV, then the simultaneous top-up injection is no longer available under the condition of 5 GeV operation of PF-AR and 2.5 GeV operation of PF. In order to mitigate this impact, the pseudo-top-top injection has been employed by fine-tuning the current of a common DC bending magnet placed at the intersection of ARBT and the BT of PF (PFBT) within a given time frame. However, this scheme limits the operation schedules, and will not be able to respond adequately to low emittance optics of PF-AR that may bring the shorter beam lifetime. In order to realize true-top-up injection, a modification of BTs'optics design was carried out. This time, details of modified design of BTs'optics and its extended plan will be presented.

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Footnotes

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Yes

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