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Application of beam-based alignment to the CLEAR facility

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The CERN Linear Electron Accelerator for Research (CLEAR) has been operating since 2017 as a user facility providing beams for a large variety of experiments. Its RF photocathode-based linear accelerator can accelerate electrons up to 220 MeV with a bunch charge of 0.1-1.5nC with single or up to 150 bunches per train. The flexibility of providing various beam parameters following user demands brings drawbacks and complexity in operating the accelerator. Standard beam steering based on the sequential variation of quadrupole and corrector magnets, performed by an operator manually, results in a very time-consuming process. This paper presents a tool we developed for automatic and global Beam-Based Alignment (BBA) for CLEAR based on dispersion-free steering and one-to-one corrections to transport beams with various charges and time structures.

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Footnotes

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Yes

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