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Utilization of Trend Data for Reliable Delivery of a Treatment Beam

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Most important ingredients of reliability in particle-therapy accelerators like HIMAC are reproducibility of a treatment beam as well as prevention of unexpected down time.

In order to realize reliable operations of medical accelerators, we take trend data of many parameters. For example, water flow of magnets has been readjusted during biweekly maintenance according to recent trend data, so that we could prevent interlock by flow-meters.

Analyzing trend data in the long term may be more important and rewarding. It was known that a treatment beam has faint fluctuations in a beam position, as measured by beam monitors. Due to this fluctuation, correction of a position had to be frequently made by steering magnets. By taking long-term trends and analyzing them, we found that this fluctuation would have seasonal characteristic. Thus, we optimized parameters of the steering magnets to minimize the effect of the fluctuation, and hence eliminated frequently retuning.

This and other cases will be discussed in the present report, together with future prospects.

Author: Mr KANTO, Yohei (Accelerator Engineering Corporation)

Co-authors: Mr UCHIYAMA, Hiroshi (Accelerator Engineering Corporation); Mr KAWASHIMA, Masahiro (Accelerator Engineering Corporation); Mr TAKADA, Eiichi (National Institute of Radiological Sciences); Mr SATO, Shinji (National Institute of Radiological Sciences); Mr IWATA, Yoshiyuki (National Institute of Radiological Sciences)

Presenter: Mr KANTO, Yohei (Accelerator Engineering Corporation)

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