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## Beam Drift at a Secondary Electron Emission Monitor Used for Dose Control in Carbon-Ion Radiotherapy

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In our therapy center, accelerators (linacs and the synchrotron with the maximum energy of 400MeV/u) have been dedicated for carbon radiotherapy. The number of treated patients has exceeded 2,000 in this May. The beam extracted from the synchrotron is transported to each treatment room and at upstream of the irradiation devices, a couple of dose monitor are located to control the dose deposition on a target. The dose monitors are secondary electron emission type in consideration of the high beam intensity. After about 4 years' operation, their sensitivity have gradually changed as the beam go through, which came out certain position dependence at the monitor.

On the other hand, extracted beam position on the monitor is slightly shifting during daytime operation with its length of around 1mm. The cause of the drift seems to arise from the closed orbit variation of the synchrotron.

Both behaviors combine and adversely affect the dose deposition. It's undesirable for the patient treatment. In this study, we present these changes (sensitivity of the monitor, daily drift of the beam position) and their impact on the dose deposition.

**Primary author:** Dr MIZOTA, Manabu (Ion Beam Therapy Center, SAGA HIMAT Foundation)

**Co-authors:** Dr TSUNASHIMA, Yoshikazu (Ion Beam Therapy Center, SAGA HIMAT Foundation); Dr HIMUKAI, Takeshi (Ion Beam Therapy Center, SAGA HIMAT Foundation)

**Presenter:** Dr MIZOTA, Manabu (Ion Beam Therapy Center, SAGA HIMAT Foundation)

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