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## Slow extraction of a dual-isotope beam from SIS18

*Tuesday, 21 May 2024 16:00 (2 hours)*

Recently, the heavy ion synchrotron SIS18 at GSI was for the first time operated with a dual-isotope beam, made up of  $^{12}\text{C}^{3+}$  and  $^4\text{He}^+$ . Such a beam can be used to improve carbon radiotherapy by providing online information on dose deposition, where the helium ions serve as a probe beam traversing the patient while depositing a negligible dose. For this, the accelerator has to deliver a slowly extracted beam with a fixed fraction of helium over the spill. The difference in mass-to-charge ratio of  $^4\text{He}$  compared to  $^{12}\text{C}$  is small enough to permit simultaneous acceleration and to make the two isotopes practically indistinguishable for the accelerator instrumentation. Yet, it may cause a temporal shift between the two components in the spill owing to the sensitivity of slow extraction to tiny tune variations. We investigated different extraction methods, and examined the time-wise stability of the dual-isotope beam with a beam monitoring setup installed in the GSI biophysics experiment room. A constant helium fraction was obtained using transverse knock-out extraction with adjusted chromaticity.

### Footnotes

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### Region represented

Europe

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