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Spill optimization system for improving slow extraction at GSI

Tuesday 3 June 2025 16:00 (2 hours)

Resonant slow extraction is routinely used to provide ion beams to various users. At GSI SIS18, two extraction methods are implemented: quadrupole-driven and Radio Frequency Knock Out (RF-KO) extraction. In either case, delivering a defined beam intensity (spill) without fluctuations or drifts is desired for an efficient beam usage. The Spill Optimization System (SOS) was developed to address this demand and improve the spill quality based on online spill monitoring. Implemented using software-defined radio technology, it comprises a feedback controlling the spill rate and an optimization algorithm to improve the spill quality. In the case of RF-KO extraction, it controls the spill by generating tailored excitation signals for the KO exciter. For quadrupole-driven extraction, it produces a control signal for the tune ramp including tune wobbling to improve the spill quality. This contribution gives an overview on the systems and compares different usage scenarios.

Footnotes

Paper preparation format

Others

Region represented

Europe

Funding Agency

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