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Benchmarking simulations of slow extraction driven by RF transverse excitation at the CERN Proton Synchrotron

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Resonant slow extraction is a beam extraction method which provides a continuous spill over a longer duration than can be achieved with fast single-turn or non-resonant multi-turn extraction. By using transverse excitation to drive the circulating particles onto the resonance, a beam can be delivered to stationary target experiments which require low intensity, long-duration beams.

In order to accurately and efficiently simulate the extraction process over a wide range of timescales, new modelling tools and computing platforms must be explored. By utilising optimised computational hardware - such as General Purpose Graphics Processing Units (GPGPUs), and next-generation simulation software (such as Xsuite), computation times for simulations can be reduced by several orders of magnitude.

This contribution presents recent developments of resonant slow extraction modelling and benchmarking with a comparison to measurements made at CERN's Proton Synchrotron (PS), with a particular focus on understanding the dynamics of transverse RF excitation and effect on spill quality.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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