Power considerations with longer cycles

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Motivation

Maximum RF voltage for $I_{RF} = 2I_{DC}$

No margin for increase of RF voltage in the second part of the ramp.

In the past, a higher RF voltage was required for a higher beam intensity.

Possible mitigation: slower ramp

Past studies:

- Calculations with 2-3 times longer ramp (T. Argyropoulos, E. Shaposhnikova, J. E. Varela, Chamonix 2014)

- Acceleration of doublet beam with 3 times longer cycle was very difficult due to transverse instabilities at the first part of the ramp; finally, 1.5 times longer cycle was used (H. Bartosik, LMC, 15 Apr. 2015)
Modified momentum programme

Can we fulfill RF power requirements and maintain transverse beam stability?

Idea is to stretch the second part by several basic periods (1.2 s each), while keeping the first part as in 2018.
Each addition of basic period results in higher available RF voltage. About 8 MV is available for a 3.6 s slower ramp.
Summary

Slower ramp is beneficial to reduce RF power during the cycle. One the contrary transverse stability requires a fast initial part of the ramp.

A new cycle was proposed that can be potentially used as an alternative back-up solution in the case of lack of RF power.

Thank you for your attention!