Experiment plan in winter 2016-17

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Study items

- Optimise RF programme (L).

- Tomography in longitudinal phase space (L).

- Identify beam loss during acceleration (L, T).

- Coupling between horizontal and vertical (T).

- Dynamic aperture in horizontal (T).

- Stacking on outer orbit (L, T).

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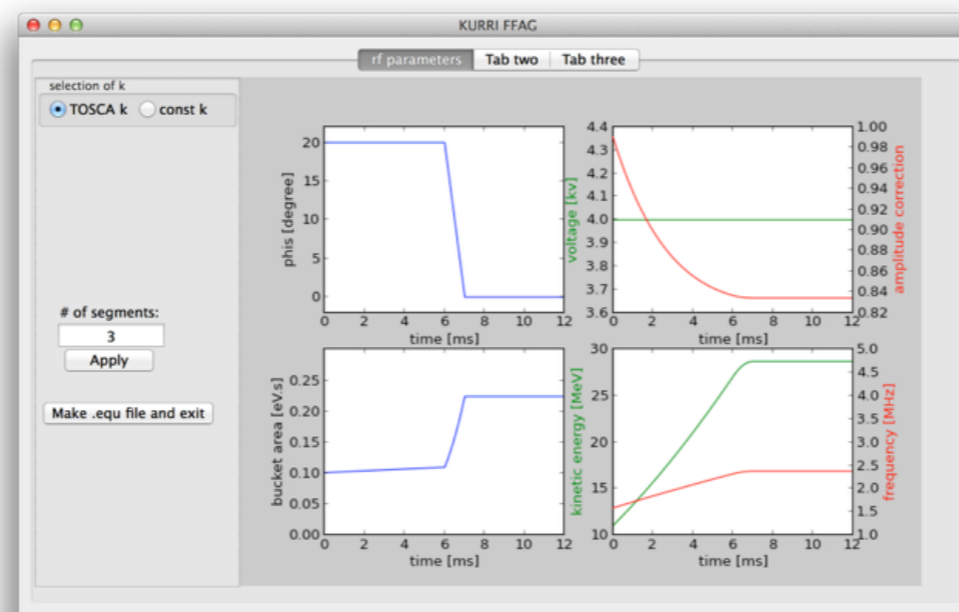Facilities Council

Optimise RF programme

Use RF script to search optimum phis and voltage.

Example 1

Accelerate with phis=20 deg for 6 ms.

Spend 1 ms from phis=20 to 0 deg.

Keep the beam for 5 ms (or more) for measurement.

Tomography in longitudinal phase space

To understand why the "optimised" setting is better than the others.

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Identify beam loss during acceleration (1)

Observed beam loss
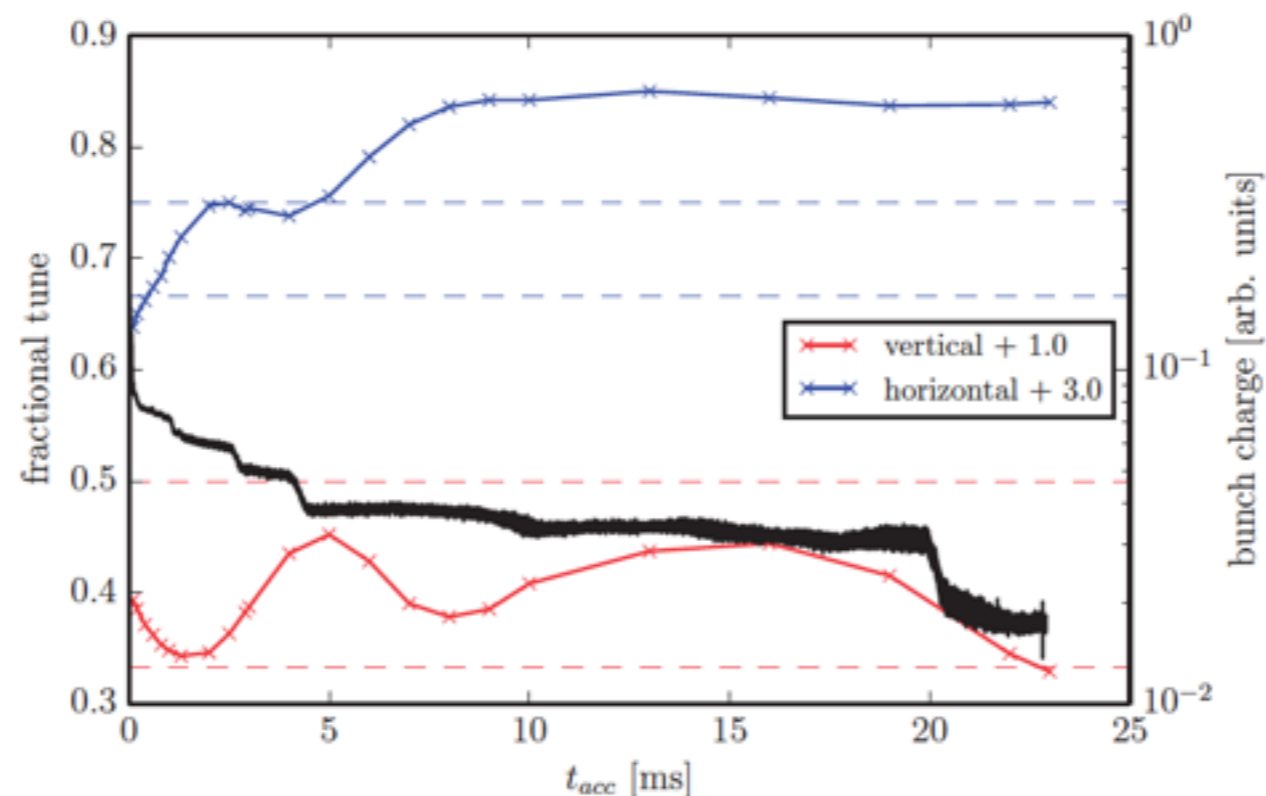Is this because of tune excursion and resonance crossing as a result?

Fig. 22. Measured fractional betatron tunes for the working point $I_F = 814\,\text{A}$ and $I_D = 1012\,\text{A}$ throughout the acceleration cycle. Horizontal lines indicate nearby structure resonances. Measured beam loss is shown in black points.
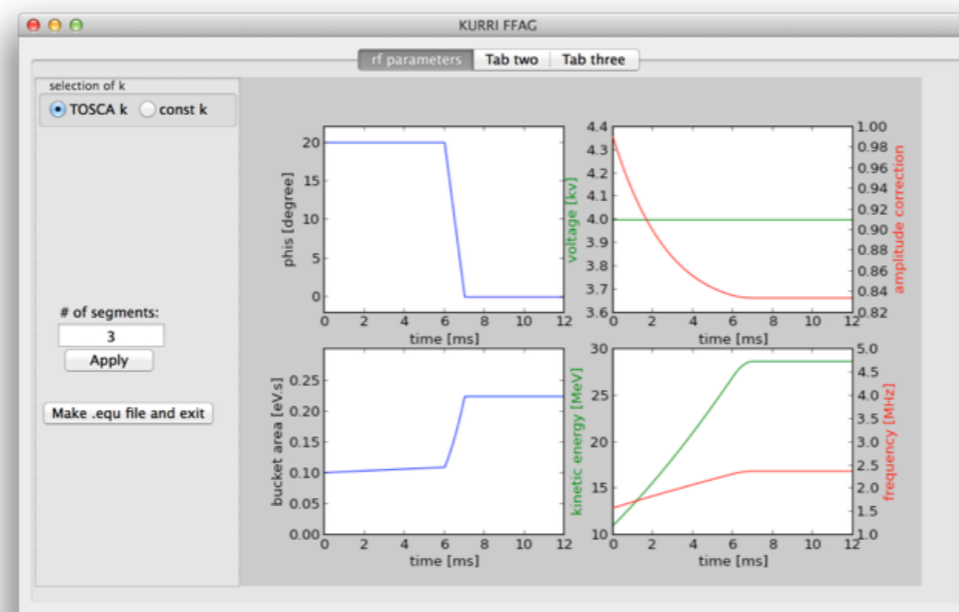
Identify beam loss during acceleration (2)

Basically tune measurement with more samples
Use RF programme script to make flat top.

Example 1

Accelerate with phis=20 deg for 6 ms.

Spend 1 ms from phis=20 to 0 deg.

Keep the beam for 5 ms (or more) for measurement.

Coupling between horizontal and vertical

Measure either quantity or both.

    Decrease of horizontal beam size (emittance).

        Injection with horizontal mismatch makes large emittance.

        Matching in vertical.

        From decay signal with horizontal scraper, calculate horizontal beam size.

    Increase of vertical beam size (emittance).

        Same injection as above.

        From beam loss signal with vertical scraper, calculate vertical beam size.

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Dynamic aperture in horizontal

Measure the following quantity.

Upper limit of horizontal beam size (emittance).

Injection with horizontal mismatch makes large emittance.

Matching in vertical.

From decay signal with horizontal scraper, calculate horizontal beam size.

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Ishi-san has already tried.

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