PS MD proposals

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Based on studies by S. Aumon, N. Biancacci, S. Persichelli, D. Ventura et al

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To characterize the impedance in a machine one can look at impedance-induced tune shifts ($\propto \text{Im}(Z_t)$) and growth rates ($\propto \text{Re}(Z_t)$).

Goals of MDs in the machine:

- Benchmark impedance model accuracy
- Check presence of unforeseen impedance sources post LS2
- Explain and mitigate any instability encountered
PS MD proposals

- Tune shift reference measurements continuation
- Impedance localization measurements
- Growth rate reference measurements
- Horizontal instability during ramp
- RF voltage induced instability at injection
- Measurements of PS PFW and F8L octupolar components with Rebecca Taylor
Tune shift reference measurements

Goal: Check if simulations match measurements when scanning bunch length, chromaticity (linear and non-linear) and energy.

Outcome: Shed light on accuracy of the impedance model and potential missing impedance sources.

Tools/comments: Cycle already exists

Use of BBQ to measure tune/chromaticity and WCM03 the bunch length. Data acquisition with PyJapcScout.

No losses expected.
**Impedance localization measurements**

Goal: Perform impedance localization measurements in both plane at flat top.

Outcome: Find localization of predominant impedance sources.

Tools/comments: Cycle already exists.

Use of BPMs to get phase advance at different locations, BBQ to measure tune/chromaticity and WCM03 the bunch length. Data acquisition with PyJapcScout.

No losses expected.
Goal: Check if simulations match measurements when scanning chromaticity (linear and non-linear) and energy.

Outcome: First indirect measurement of real part of the impedance model, gives confidence in our model when studying machine instabilities with it. New measurements procedures.

Tools/comments: Cycle already exists.

Use of BBQ (maybe BPM) to measure beam position/chromaticity and WCM03 the bunch length. Data acquisition with PyJapcScout.

Losses expected but beam intensity should remain low.
Horizontal instability during ramp

Goals: Study instability during the ramp and match measurements with simulations. Assess impact of BFA09S cable termination on-line.

Outcome: Understand instability and prevent it from limiting machine performances. Find missing impedance sources in our model and potential impedance reduction in the machine.

Tools/comments: Need a custom cycle with intermediate energy and frozen beam parameters.

Use of BPM (not BBQ as previously done) to measure beam position, BBQ for chromaticity, WCM03 for bunch length and OASIS for instability monitoring. Data acquisition with PyJapcScout.

Beam losses to be monitored.
RF voltage induced instability at injection

Goals : Study instability at injection when reducing 10 MHz cavity RF voltage.

Outcome : Understand instability and prevent it from limiting machine performances.

Tools/comments : Cycle already exists.

Use of tomoscope for beam longitudinal parameters and OASIS for instability monitoring. Data acquisition with PyJapcScout.

Beam losses to be monitored.
Measurements of PS PFW and F8L octupolar components

Goal: Measurements of Pole Face Windings and Figure-of-eight Loops non linear chromaticity and octupolar contributions to the field of the main units.

Joined efforts with Rebecca Taylor to measure these components.

Outcome: Obtention of transfer matrices and improvements of machine knobs.

Tools/comments: Any cycle can be used.

Use of AC dipole and BBQ to measure the action and tune/chromaticity. Data acquisition with PyJapcScout.

No losses expected.

1 Mariusz Juchno
PS MD proposals

- Tune shift reference measurements continuation
- Impedance localization measurements
  • Can start now
- Growth rate reference measurements
- Horizontal instability during ramp
  • Need custom cycle first
- RF voltage induced instability at injection
  • Can start now
- Measurements of PS PFW and F8L octupolar components with Rebecca Taylor
  • Start time to be discussed with Rebecca