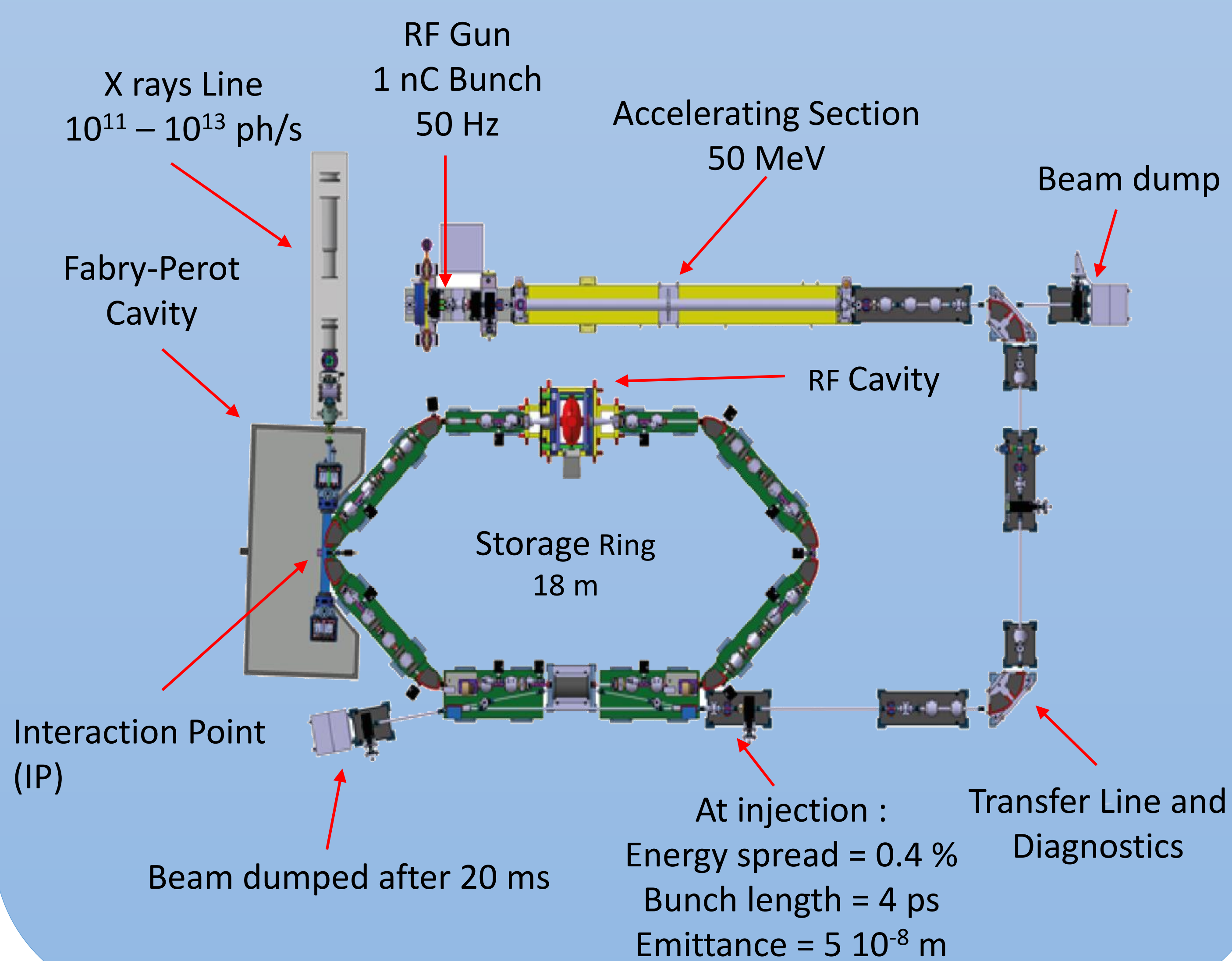


This work is supported by the French "Agence Nationale de la Recherche" as part of the program "investing in the future" under reference ANR-10-EQPX-51. This work was also supported by grants from Région Ile-de-France and IN2P3.

Abstract: A CST Particle Studio impedance simulation of the different components of the ring (BPM, bellows, optical chamber, etc.) is under way. It will be followed by a bench measurement of the longitudinal and transverse impedance using the coaxial wire method. This poster will detail the first results of ThomX storage ring impedance simulations and the measurement principle we will use.

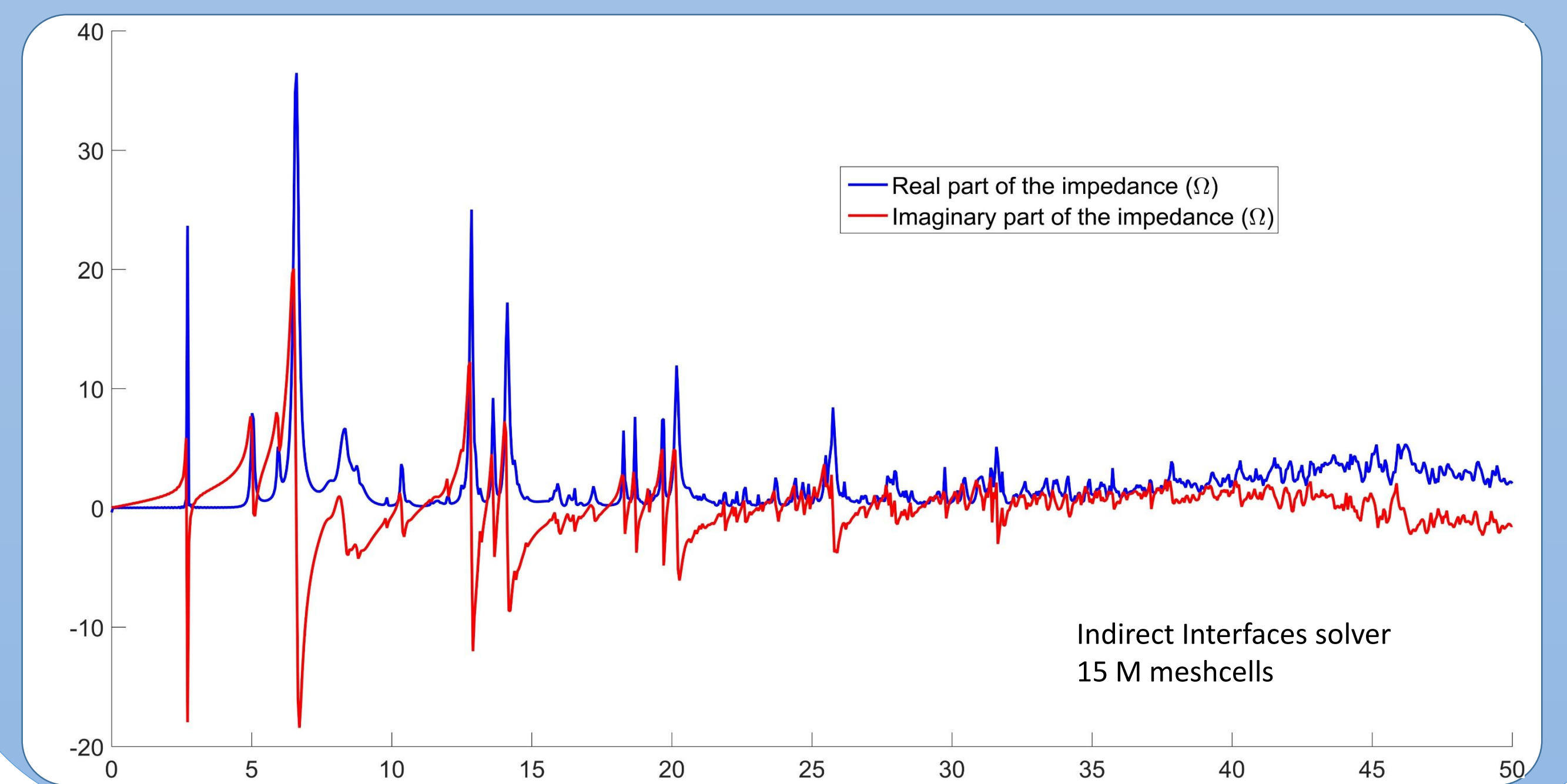
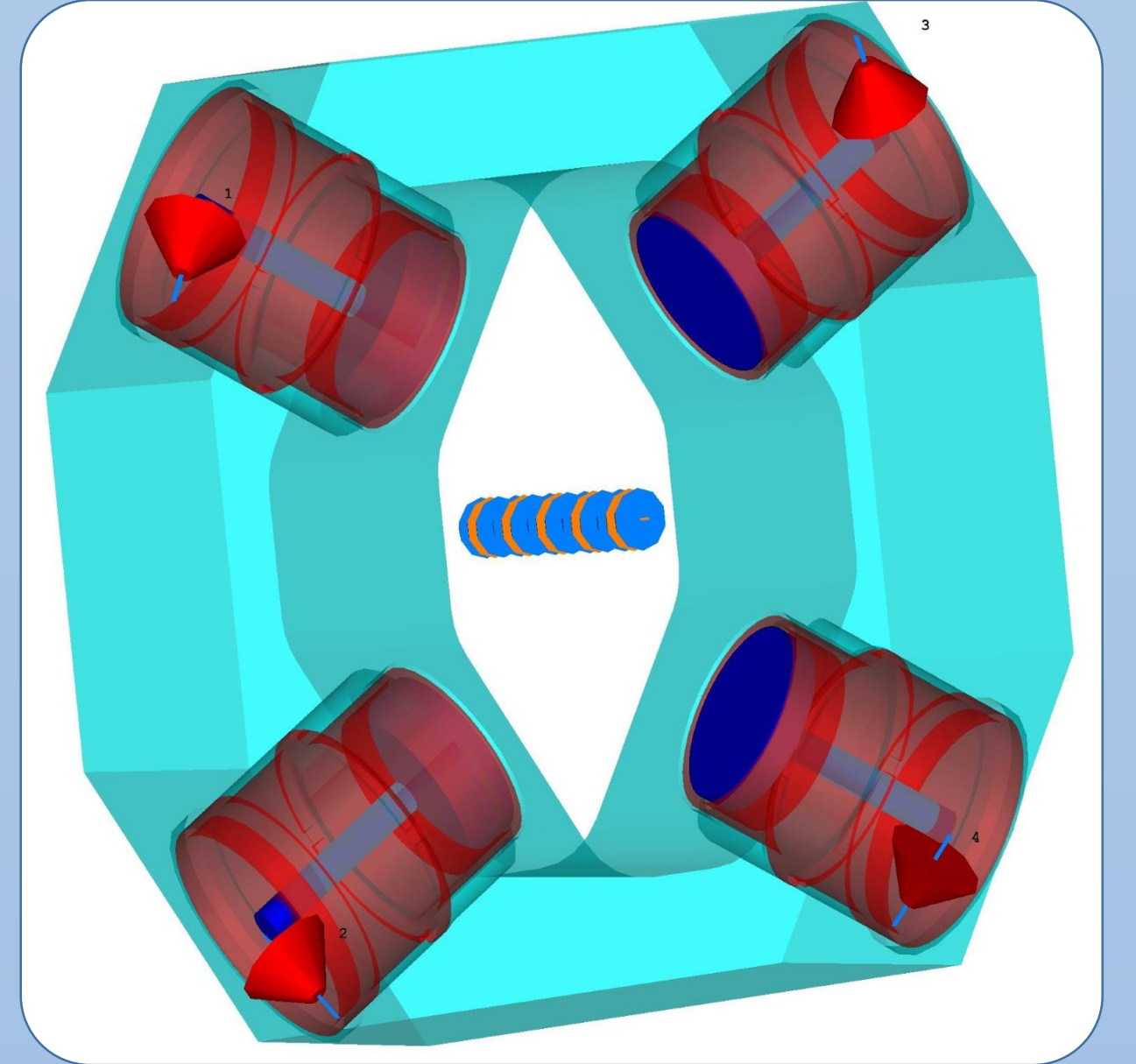
ThomX

- ThomX is a 50 MeV compact Light Source based on Compton Backscattering^[1]
- Damping time \gg storage time
- Important to know and minimize possible sources of instabilities and beam degradation



Impedance Simulations

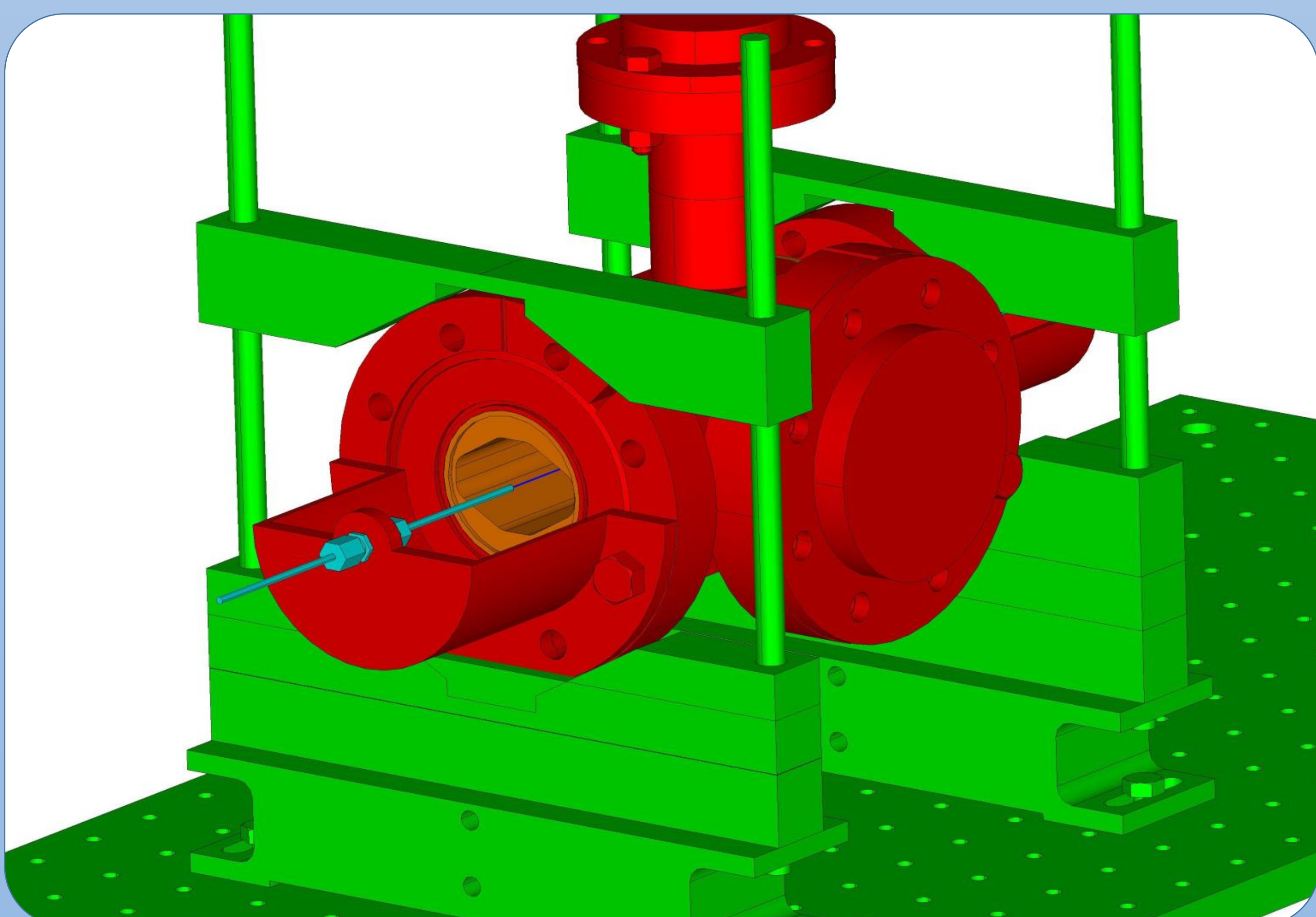
CST PS wakefield simulations are performed for the simplified geometry of a 4 button BPM. The stainless steel structure is represented in light blue, the molybdenum buttons are in dark blue and the alumina insulator is in red. Lumped ports of 50Ω are used to model the output coax cables of the BPM and to prevent unwanted reflections at the end of the structure.



Impedance Measurements

Bench measurements of the impedance using the coaxial wire method^[2] are going to start in the coming months to cross check the simulations. Measures up to 9 GHz will include :

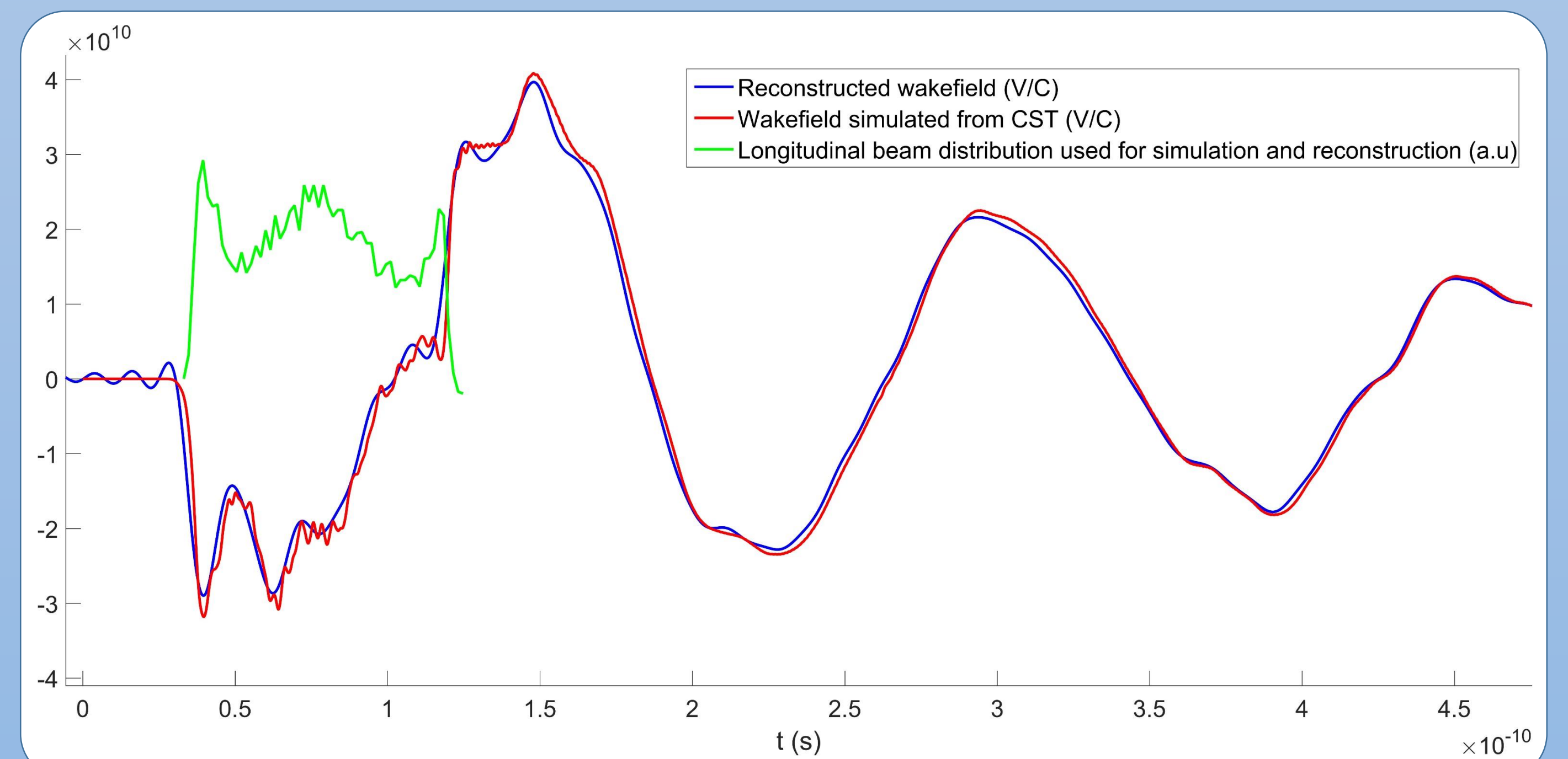
- Longitudinal impedance measurements from classical wire method
- Transverse dipolar impedance from two wires measurements
- Transverse quadrupolar impedance from wire scans



Mechanical drawing of the measurement setup with wire in dark blue, DUT in orange, flanges and boxes in red, electronics in light blue and mechanical support in green

Wakefield Reconstruction

Using simulation results it is possible to extract the wake function for a given geometry. Then by convoluting the wake function with a longitudinal beam distribution you get the wakefield excited by this distribution :



References

- [1] - ThomX TDR
- [2] - T. Kroyer, F. Caspers, E. Gaxiola, Longitudinal and transverse wire measurements for the evaluation of impedance reduction measures on the MKE extraction kickers, ABNote-2007-028