



Contribution ID: 1533 Contribution code: TUPA160

Type: **Poster Presentation**

## Validation of control loop modeling for power limitation studies with beams for HL-LHC

*Tuesday, 9 May 2023 16:30 (2 hours)*

For HL-LHC intensities, transient beam loading after injection between the Super Proton Synchrotron (SPS) and the Large Hadron Collider (LHC) is expected to push the RF power in the LHC to the limit of the installed system. A detailed understanding of this process is necessary to minimize beam losses during LHC injection. Realistic models of the local SPS and LHC cavity control systems were implemented in the Beam Longitudinal Dynamics (BLonD) simulation suite to model bucket-by-bucket and turn-by-turn transient effects. We show the results of studies and detailed benchmarks of key observables such as bunch-by-bunch spacing, RF power at 2023 beam intensity and transfer functions against theory and measurements.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** KARLSEN-BÆCK, Birk Emil (European Organization for Nuclear Research)

**Co-authors:** ARGYROPOULOS, Theodoros (European Organization for Nuclear Research); CALAGA, Rama (European Organization for Nuclear Research); KARPOV, Ivan (European Organization for Nuclear Research); TIMKO, Helga (European Organization for Nuclear Research)

**Presenter:** KARLSEN-BÆCK, Birk Emil (European Organization for Nuclear Research)

**Session Classification:** Tuesday Poster Session

**Track Classification:** MC4: Hadron Accelerators: MC4.A04: Circular Accelerators