



Contribution ID: 1217 Contribution code: MOPC11

Type: **Poster Presentation**

## Mastering longitudinal losses for HL-LHC

*Monday, 20 May 2024 16:00 (2 hours)*

Power limitations are expected at injection for the main Radio Frequency (RF) system due to the doubled bunch intensity in the High Luminosity (HL-) Large Hadron Collider (LHC). One way to overcome these power limitations is to reduce the capture voltage. The smaller RF bucket, however, increases both capture and flat-bottom beam losses. In practice, the start of the ramp losses, which is the sum of capture and flat-bottom losses, cause beam dumps if the capture voltage is reduced too much. In this contribution, we analyze start-of-ramp losses as recorded during operation, and model capture losses as a function of RF voltage, as well as phase and energy errors at injection. The correlation between start-of-ramp and flat-bottom losses is investigated by mapping the abort gap population to the Beam Loss Monitor (BLM) threshold. The aim is to understand the proportions of different beam loss contributions and optimize the future RF parameters such that the main RF system can capture and retain the HL-LHC beam intensities within acceptable loss limits.

### Footnotes

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

Europe

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**Session Classification:** Monday Poster Session

**Track Classification:** MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.A01 Hadron Colliders