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## Understanding of the new horizontal instability at the PS Booster after LIU

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Following the LHC Injectors Upgrade (LIU) project at CERN, the Proton Synchrotron Booster (PSB) has been upgraded to operate with a new injection kinetic energy of 160 MeV and an extraction energy of 2 GeV. To understand the performance of the accelerator in this new energy range, a series of measurements have been conducted, especially devoted to the beam stability to ensure the optimal operation of the machine. A horizontal instability, firstly observed in 2021 at about 1.6 GeV (between the old and the new extraction energy of the Proton Synchrotron Booster), has undergone in-depth investigation in measurements. Despite the identification of a mitigation strategy to cure the horizontal instability, efforts have also been focused to understand its source. The results have once again drawn the attention to the termination of the extraction kicker. As happened in 2018, a dedicated MD performed at the end of 2023 run with matched kicker termination confirmed the impact of the extraction kicker in this instability.

### Footnotes

### Funding Agency

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### Region represented

Europe

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