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Experience with the CERN LINAC4 and its performance during the first four years of operation

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Since 2020 LINAC4 provides the protons for the entire CERN accelerator complex. It accelerates H⁻ ions to a kinetic energy of 160 MeV and injects them into the Proton Synchrotron (PS) Booster using a charge exchange injection mechanism. The performance requirements have been successfully met since 2021. This paper presents the operational experience gained, together with availability and reliability statistics for LINAC4, during its first four years of operation, and details the key performance indicators for beam quality and stability. It also discusses the main issues encountered and the implemented solutions that have allowed further improvements to be made. Recent developments on the H⁻ ion source have led to an increase of the beam current from the original 35 mA to 50 mA, opening the possibility to increase the intensity delivered to the PS Booster for the benefit of CERN's experimental programmes. Beam energy modulation in LINAC4 has also been developed to increase the PS Booster bunch intensity for which the results of beam tests are presented.

Footnotes

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