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Operational experience of a low beam coupling impedance injection kicker magnet for the CERN SPS ring

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The CERN SPS injection kicker magnets (MKP) were developed in the 1970's, before beam power deposition was considered an issue. There are two types of these magnets in the SPS: MKP-S (small aperture) and MKP-L (large aperture) versions. The MKP-L magnets are very lossy from a beam impedance perspective: this would be an issue during SPS operation with the higher intensity beams needed in the future for HL-LHC. Hence, a beam screen has been developed, which is inserted in the aperture of each MKP-L module. The screen consists of silver fingers applied to alumina U-shaped chambers: the fingers have been optimized to achieve both adequately low beam induced power deposition and good high voltage (HV) behaviour. A surface coating, with a low secondary electron yield, is applied to the inner surface of the alumina chambers to reduce dynamic vacuum. The low-impedance MKP-L has been extensively HV tested in the lab before installation in the SPS. This paper briefly presents the design and focuses on the operational experience in the SPS, including heating and vacuum.

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Footnotes

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