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## Impedance reduction of the beam gas ionization monitors for the CERN SPS

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The beam gas ionization monitors (BGIs) are non-destructive instruments to measure the transverse beam profiles. With the goal to double the beam intensity in the injector chain for the High-Luminosity Large Hadron Collider (HL-LHC), any element contributing to the overall beam coupling impedance requires an in-depth impedance evaluation from the design stage. This paper presents the beam coupling impedance optimization and mitigation study of the beam gas ionization monitors for the Super Proton Synchrotron (SPS) at CERN. Detailed electromagnetic simulations of the 3D model were carried out already before the construction of the prototype. Consequently, geometrical modifications required for impedance mitigation were still possible and were investigated while keeping the functionality of the device. We present different mitigation measures as coatings, RF-fingers and the introduction of additional loss mechanisms to dampen resonances of the geometry. At last, a comparison of the instrument design before and after impedance reduction is shown.

### Footnotes

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Europe

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