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The LIU Project: Vacuum performance simulation of the upgraded SPS accelerator

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The LHC injectors Upgrade (LIU) project has the goal to prepare the injector chain to reliably deliver the beams required by the High Luminosity LHC (HL-LHC) era, aiming at doubling beam intensity while reducing the beam emittance. At the last stage of the injector chain, the Super Proton Synchrotron (SPS) will be extensively modified in the scope of LIU, starting in 2019. It will feature a new dumping system, upgraded RF system, upgraded extraction channels and carbon coated vacuum chambers.

The vacuum performance is one of the key factors of the project: the analysis of the challenging upgrades to the vacuum layouts is presented, mainly focusing on the modifications taking place in Long Straight Sections 1 and 5, triggered by the relocation of the new beam dumping system. The evaluation of the vacuum performance of the new layouts has been carried out through the electrical network analogy: the expected time-dependent profiles are shown together with the predicted pressure at 24h of pump down.

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