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Study on the beam induced vacuum effects in the FCC-hh beam vacuum chamber

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The vacuum chamber of the FCC-hh will have to cope with unprecedented levels of synchrotron radiation power for proton colliders, dealing simultaneously with a tighter magnet aperture. Since the high radiation power and photon flux will release larger amounts of gas into the system, to keep a good vacuum level in the FCC-hh becomes considerably more challenging than in the LHC.
This contribution presents the study carried out on the FCC-hh beam induced vacuum effects, the different phenomena which, owing to the presence of the beam, have an impact on the residual gas density. It is concluded that thanks to the proposed mitigation measures, the vacuum level in the FCC-hh should be adequate, allowing to reach the molecular density requirement of better than $\leq 1 \times 10^{15}$ $H_{2\,eq}/m^3$ with baseline beam parameters within the first months of conditioning.

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