



Contribution ID: 1600 Contribution code: THPA161

Type: Poster Presentation

DYVACS (DYnamic VACuum Simulation) code: gas density profiles for dynamic conditions in particle accelerators - simulations for the LHC and the FCCee

Thursday, 11 May 2023 16:30 (2 hours)

The computation of residual gas density profiles in particle accelerators is an essential task to optimize beam pipes and vacuum system design. In a hadron collider such as the LHC, the beam induces dynamic effects due to ion, electron and photon-stimulated gas desorption. The well-known VASCO code developed at CERN in 2004 was already used to estimate pressure profiles in steady state conditions. Nevertheless, some phenomena are not taken into account such as the ionization of residual gas by the electron clouds and the evolution of the electronic density related to the electron cloud build up. Therefore, we proposed an upgrade of this code by introducing electron cloud maps to estimate the electron density and the ionization of gas by electrons to calculate pressure evolution in dynamic conditions. Results obtained with DYVACS reproduces with a good accuracy the experimental dynamic pressure recorded in the VPS beam pipes sector** of the LHC from the proton beam injection to the stable beam period, for several materials of vacuum chamber. Additionally, DYVACS was used as a predictive tool to compute the pressure evolution in the beam pipes for the Future Circular Collider e- e+.

Funding Agency

Footnotes

- A. Rossi, Tech. Report, LHC Project Note 341 ** T. Demma et al Phys. Rev. Accel. and Beams 10, 114401 (2007) *** B. Henrist et al, Proc. IPAC2014, Dresden

I have read and accept the Privacy Policy Statement

Yes

Primary author: BILGEN, Suheyla (Université Paris-Saclay, CNRS/IN2P3, IJCLab)

Co-authors: MERCIER, Bruno (Université Paris-Saclay, CNRS/IN2P3, IJCLab); BAGLIN, Vincent (European Organization for Nuclear Research); SATTONNAY, Gaël (Université Paris-Saclay, CNRS/IN2P3, IJCLab)

Presenter: BILGEN, Suheyla (Université Paris-Saclay, CNRS/IN2P3, IJCLab)

Session Classification: Thursday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T14: Vacuum Technology