38th INTERNATIONAL CONFERENCE ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **1206** Type: **Oral Presentation**

Research program on the cryogenic beam-vacuum of the FCC-hh (15' + 5')

Thursday 4 August 2016 10:00 (20 minutes)

The FCC-hh is an accelerator with unique vacuum issues. Naively it could be thought of as a beefed-up LHC, but a careful scrutiny of its technical specifications immediately shows that it presents distinctive features which are nowhere to be found in the present LHC or even in its funded upgrade, HiLumi-LHC. Its peculiarity stems from the fact that FCC-hh is characterized by extremely high synchrotron radiation (SR) power density and photon flux while at the same time technology- and cost-wide issues call for a smaller cold-bore diameter with respect to the present 8.3 tesla dipoles of the LHC. Another important constraint for the design of the beam screen (BS) comes from the need to remove the SR power at a temperature as high as allowed by vacuum considerations in order to minimize the capital and operational costs of the cryogenic cooling system. The design of the BS in the arcs is presently the subject of a EuroCirCol work package 4 (*) collaboration between 6 different research centers, aiming at developing and testing a conceptual BS suitable for installation in the 16 tesla FCC-hh dipoles. This paper highlights the current status of the analysis of the performances of the BS, via coupled montecarlo simulations for SR and molecular flow, and coupled electromagnetic-thermo-mechanical calculations as well. The latter take into account the powerful forces generated during a simulated dipole quench, and the complex SR heat transfer across the novel BS geometry. In parallel, the collaboration is designing a test-stand for installation of a prototype BS at the 2.5 GeV light source ANKA, where the SR spectrum of the FCC-hh can be reproduced quite accurately. The currents status of the design of the test bench and its main goals will also be briefly highlighted. These activities are mainly carried out at CERN, while studies covering electron-cloud mitigation measures, involving other participating EuroCirCol WP4 collaboration institutions, are also briefly highlighted.

(*)This project has received funding from the European Union's Horizon 2020 research and innovation programme (EuroCirCol)

Primary author: KERSEVAN, Roberto (CERN)

Presenter: KERSEVAN, Roberto (CERN)

Session Classification: Accelerator: Physics, Performance, R&D and Future Facilities

Track Classification: Accelerator: Physics, Performance, R&D and Future Accelerator Facilities