SERVICE DE METROLOGIE NUCLEAIRE

Proposition de stages et mémoires

2021-2022

Le Service de Métrologie Nucléaire poursuit des activités dans les domaines de la proton thérapie et de la physique des accélérateurs avec plusieurs partenaires incluant l'Organisation Européenne pour la recherche nucléaire (CERN), Ion Beam Applications (IBA), le SCK-CEN et Royal Holloway (University of London). Les mémoires suivants sont proposés dans le cadre de ces collaborations aux étudiants de MA2 pour l'année académique 2021-2022.

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1. Machine protection studies for the High-Luminosity LHC (HL-LHC)

Mémoire et possibilité de couplage avec un stage MA2

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With a nominal stored energy of 362 MJ in each of the two proton beams of the LHC, which will be further increased to about 700 MJ in the future High Luminosity LHC (HL-LHC), uncontrolled beam losses represent a significant challenge for the integrity and safe operation of the machine. This work will focus on fast failures, critical for the protection and integrity of the machine and will study these failure modes with beam tracking simulations. A complete model of the HL-LHC will be provided, along with a toolbox to perform simulations, as done at CERN.

Cases related to the installation of new components in the machine (in particular, the hollow electron lens and the so-called "crab" cavities) will be studied in detail and discussed with experts at CERN.

Figure 1 Measurement test bench for a very precious high-luminosity LHC magnet.