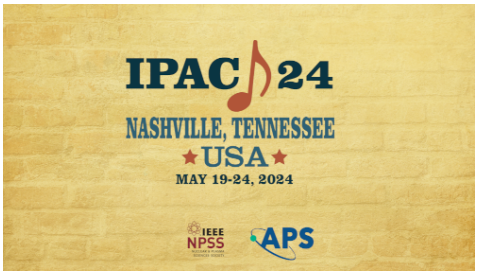

Contribution ID: **564** Contribution code: **MOPC18** Type: **Poster Presentation**

Simulated impact of the HL-LHC beam on a graphite target

Monday, 20 May 2024 16:00 (2 hours)

In the High Luminosity Large Hadron Collider (HL-LHC) era, the intensity of the circulating bunches will increase to 2.2e+11 protons per bunch, almost twice the nominal LHC value. Besides detailed studies of known and new failure cases for HL-LHC, *it is also required to investigate failures beyond nominal design. The consequence of such failures can be the impact of a large number of high-energy particles in one location, resulting in a significantly increased damage range due to an effect called hydrodynamic tunneling.The phenomena is studied by coupling FLUKA, an energy deposition code, and Autodyn, a hydrodynamic code. This paper presents the simulated evolution of the deposited energy, density, temperature and pressure for the impact of the HL-LHC beam on a graphite target. It then computes the resulting tunneling range and finally compares the outcome with previous studies using LHC intensities.***

Footnotes

- B. Lindstrom et al., "Fast failures in the LHC and the future high luminosity LHC,"Phys. Rev. Accel. Beams, vol. 23, no. 8, p. 81001, Aug. 2020 ** N. A. Tahir et al., NIM B, 427 (2018), 70–86 *** C. Wiesner et al., J.Phys.Conf.Ser. 2420 (2023) 1, 012004, JACoW IPAC2022 1870-1873

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

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Session Classification: Monday Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.A01 Hadron Colliders