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TOWARDS AN ANALOGUE ENVIRONMENT FOR SPACE RADIATION AND RADIOBIOLOGY
INVESTIGATIONS: THE LASER PLASMA ACCELERATORS CASE

Abstract

Space radiobiology (SPRB) is an interdisciplinary science that examines the biological effects of ionizing radiation on humans involved in aerospace missions. One of the crucial points in advancing the knowledge in this field is enhancing the possibility of generating experimental data; to that, space radiation reproduction is mandatory. Using the analogue approach that in many other areas of space research is of great success, it could be possible to use Laser Plasma Accelerators (LPA) to reproduce the space radiation condition in ground experiments and design radiobiology investigations in the space environment. LPA can robustly generate particle beams, such as electrons, protons, neutrons, ions, and photons, with a wide range of accessible parameters. Several facilities are equipped with LPAs; however, to fully understand the radiobiology mechanism and models, ad hoc tuning of all the LPAs parameters to reproduce the exposure conditions is mandatory. In this talk, I will present a review of the status at the theoretical level of such topics as well as the start of activity that the AMS INFN Roma Sapienza Group is doing in collaboration with researchers of the National Institute for Laser, Plasma and Radiation Physics (INFLPR) research institute in Bucharest, towards the identification of exposure protocols and methodologies for improving Space Radiation testing analogues using LPAs using the Alpha Magnetic Spectrometer (AMS02) detector Cosmic Rays fluxes and spectra measurements.