

# **Space Radiobiology - Synergies between Astroparticle and Medical Physics**

Alessandro Bartoloni

This talk explores the dynamic interplay between astroparticle and medical physics, emphasizing how these disciplines converge to address challenges in radiation science and its applications. Key topics include space radiation, its implications for human space exploration, and strategies for radiation protection. By assessing health risks and evaluating space radiation sources, the book develops a comprehensive perspective on safeguarding astronauts during missions.

Beyond space applications, the talk highlights the synergies between radiobiology and the medical use of ionizing radiation, demonstrating how interdisciplinary research fosters innovative approaches to understanding and mitigating the effects of radiation on biological systems. Lessons drawn from space science are used to inform and enhance medical practice.

A case study on the Alpha Magnetic Spectrometer (AMS) research group at the INFN Roma Sapienza division serves as a concrete example of successful interdisciplinary collaboration. It illustrates the value of shared methodologies and technologies, advocating for the creation of common platforms for radiation measurement and monitoring, as well as tools that can serve both the space exploration and medical fields. This book is an essential resource for researchers, professionals, and students in physics, space science, and the medical domain.

On this subject it was also requested by World Scientific publisher to write a book that will be available on September 2025.

## **Alessandro Bartoloni – un Bio essenziale**

Alessandro Bartoloni began his career in 1992 at the Italian Institute of Nuclear Physics (INFN). There he worked at the Roma Sapienza University division on developing supercomputers for numerical simulations in theoretical physics. His expertise expanded further during his tenure as a User Associate at the European Organization for Nuclear Research (CERN), where he actively contributed to the construction of the Compact Muon Solenoid (CMS) detector at the Large Hadron Collider (LHC). Between 1999 and 2011, he served as a Lecturer at the Faculty of Engineering at La Sapienza University of Rome, overseeing courses related to computer science. Since 2000, he has been an integral part of the Alpha Magnetic Spectrometer collaboration (AMS02), a cutting-edge particle physics detector designed for operation as an external module on the International Space Station. Alessandro's primary areas of expertise include cosmic rays' physics, space radiation science, and space radiobiology, reflecting his dedication to advancing our understanding of these critical aspects within space exploration.