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Astroparticle Experiments to Improve the Biological Risk Assessment of Exposure to Ionizing Radiation in the Exploratory Space Missions:The research topic initiative.

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The actual and next decade will be characterized by an exponential increase in the exploration of the Beyond Low Earth Orbit space(BLEO). Moreover, the firsts tentative to create structures that will enable a permanent human presence in the BLEO are forecast. In this context, a detailed space radiation field characterization will be crucial to optimize radioprotection strategies (e.g., spaceship and lunar space stations shielding), to assess the risk of the health hazard related to human space exploration, and to reduce the damages potentially induced to astronauts from galactic cosmic radiation. In this context, since the beginning of the century, many astroparticle experiments aimed at investigating the unknown universe components (i.e., dark matter, antimatter, dark energy) have collected enormous amounts of data regarding the cosmic rays (CR) components of the radiation in space.

Such experiments are cosmic ray observatories. The collected data (cosmic ray events) cover a significant period and permit to have integrated information of CR fluxes and their variations on time daily. Further, the energy range is exciting since the detectors operate using instruments that allow measuring CR in a very high energy range, usually starting from the MeV scale up to the TeV, not usually covered by other space radiometric instruments. Last is the possibility of acquiring knowledge in the full range of the CR components and their radiation quality

The collected data contains valuable information that can enhance the space radiation field characterization.

In this talk, the status of the art in this research topic will be presented and the research topic initiative titled "Astroparticle Experiments to Improve the Biological Risk Assessment of Exposure to Ionizing Radiation in the Exploratory Space Missions" will be presented.
We launched it in December 2021 on three different Frontiers Journals (Astronomy and Space Science/Astrobiology, Public Health/Radiation and Health, Physics/Detectors, and Imaging).

Collaboration

AMS/SPRB

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