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Radiation Fields, Effects and Risks in Human Space Missions (4)

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RECENT OBSERVATIONS OF SPACE RADIATION ENVIRONMENT IN A HUMAN PHANTOM ONBOARD ISS BY LIULIN-5 PARTICLE TELESCOPE

Abstract

The radiation field in the International Space Station (ISS) is complex, composed by galactic cosmic rays, trapped radiation of the Earth radiation belts, solar energetic particles, albedo particles from Earth's atmosphere and the secondary radiation produced in the shielding materials of the spacecraft and in human body. An essential parameter for assessment of radiation hazards to human in space is the organ dose determination. Human phantoms equipped with active and passive radiation detectors are used to obtain a better knowledge of the dose distribution inside the human body. The Liulin-5 charged particle telescope has directly observed the radiation environment in the tissue -equivalent phantom of MATROSHKA-R international project on ISS during the period June 2007-June 2010. The objectives of Liulin-5 experiment are studying the dynamics of depth-dose distribution of the different components of the orbital radiation field in a human phantom and mapping the radiation environment and its variations with time and orbital parameters (such as solar cycle, solar flare events, inclination and altitude). The particle telescope Liulin-5 measures time resolved linear energy transfer spectrum, flux and absorbed dose rates for electrons, protons and the biologically relevant heavy ion components of the cosmic radiation. In this report we present new results of Liulin-5 experiment for radiation quantities obtained from different components of

the complex radiation field in low-Earth orbit and comparison with data from other radiation detectors on ISS.