Life Sciences as Related to Space (F)
Space Radiation - Dosimetric Measurements and Related Models, Radiation Detector Developments and Ground-based Characterisation (F2.3)

THE DOSIS 3D PROJECT ONBOARD THE INTERNATIONAL SPACE STATION - ANALYSIS OF THE SOLAR PARTICLE EVENT IN SEPTEMBER 2017

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Besides the effects of the microgravity environment, and the psychological and psychosocial problems encountered in confined spaces, radiation is the main health detriment for long duration human space missions. The radiation environment encountered in space differs in nature from that on earth, consisting mostly of high energetic ions from protons up to iron, resulting in radiation levels far exceeding the ones encountered on earth for occupational radiation workers. Accurate knowledge of the physical characteristics of the space radiation field in dependence on the solar activity, the orbital parameters and the different shielding configurations of the International Space Station ISS is therefore needed. As a follow up to the DOSIS experiment (2009 - 2011) DOSIS 3D measures since May 2012 the spatial and temporal variations of the radiation field in Columbus. The active part the DOSIS MAIN BOX thereby consist of two active radiation detectors (Dosimetry Telescopes = DOSTELs) with a DDPU (DOSTEL Data and Power Unit) is mounted in a Nomex pouch at a fixed location in the bottom area of the European Physiology Module rack (EPM). The temporal variation in dependence of ISS altitude and solar cycle has been measured with the DOSTEL instruments since May 2012 covering thereby already 6 years of continuous measurements in the frame of DOSIS 3D. Of special interest was the first Solar Particle Event (SPE) (GLE 72) measured inside the Space Station within the DOSIS 3D project in September 2017. This was the first event measured since 2012 inside the ISS and in terms of exploration missions extremely important, since it was also measured in Moon orbit and at the surface of Mars. The presentation will focus on the timeline of the event observed inside Columbus and provide data for dose and relevant energy deposition spectra and also show first comparisons with GEANT4 simulations. It will also provide comparison with events observed with DOSTEL like instruments on space station MIR (1997) and on ISS (2001). The CAU contributions to DOSIS and DOSIS 3D are financially supported by BMWi

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