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

THE MATROSHKA-III EXPERIMENT ONBOARD THE ISS – DEVELOPMENT STATUS

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Radiation is currently seen as one of the main hazards for humans regarding long duration space missions especially mission planning beyond Low Earth Orbit (LEO). For the assessment of the radiation risk relevant radiation field models and tools can be applied. These all need and have to be benchmarked against real measured space data. The Matroshka-III (MTR-III) experiment as part of the Russian space experiment Matroshka-R Stage 5 (MTR-R) and realized within the framework of the Russian space research program will answer the questions about the distribution of dose within a human body and provide valuable input data for radiation transport calculations. The objective of the MTR-III experiment is to extend the measurements performed during the Matroshka (MTR) -1 and 2 experiments in a period of minimal solar activity to a complete solar cycle thereby covering also depth dose distributions during solar particle events. For this research the new MTR-III experiment uses an updated interface, improved software and new developed detector systems to allow the first time a continuous record of the doses in inner organ locations. Measurements will be performed in different ISS Modules (SM, MIM-1, MIM-2, MLM, NEM and others). The dose distribution inside the organ

sites will be separately measured for the different sources of the radiation field (Trapped Radiation, Galactic Cosmic Rays and Solar Energetic Particles and neutrons) for selected locations inside the modules. The collected data serve to assess the risk of astronauts in dependence on geo- and heliophysical conditions and of various shielding configurations. They will also help to reduce the uncertainties in estimates of radiation risk and for the refinement of transport calculations through realistic shielding distributions that are needed for risk predictions in future missions. The presentation will give the current design status and detector development for the upcoming MTR-III mission.