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Radiation Fields, Effects and Risks in Human Space Missions (5)

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THE FACILITY FOR SPACE RADIATION BIOLOGY EXPERIMENT ON THE CHINESE SPACE
STATION

Abstract

The radiation in Low Earth Orbits (LEO) is composed mainly of the high energy long-range galactic cosmic rays (GCRs), solar energetic particles (SEPs), radiation belt particles and the secondary neutrons and protons. Astronauts and biological samples in space exposed to the space radiation can induce variety of biological effects. The space radiation biology researches mainly focus on the mechanism of organism damage and genetic variation caused by space radiation to improve the radiation protection of the space manned mission. A universal radiation biology experiment facility is designed and will be installed on the Chinese Space Station, which is expected to be operated fully on 2022. The facility can provide suitable environment (such as temperature and air) and culture medium for the model organisms, which could be *Caenorhabditis elegans*, microbial spores, plant seeds and bio-organic molecules. The status and movements of the *Caenorhabditis elegans* will be monitored real-time by a microscopy to study the radiation effects on orbit. The absorbed dose, dose equivalent, LET spectrum and radiation quality factor of space radiation will be measured with both active and passive detectors. The locations of heavy ions hitting the plant seeds can also be obtained by the plastic nuclear track detectors. Through this facility, the relationship between the bio-effects and space radiation will be studied, as well as the mechanisms of space bio-effects.