SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Fields, Effects and Risks in Human Space Missions (4)

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LOW COST SYSTEM FOR IONIZING RADIATIONS MONITORING IN SPACE

Abstract

Space environment is characterized by microgravity conditions and ionizing radiations. It has been proven that these peculiarities pose significant health risks for human life in space. Results of different biomedical researches demonstrate an increase of cancer and osteoporosis in astronauts exposed to space environment for a relative long period. This is a concern for future space missions and also for future space civilian flights. Nevertheless, at the same time it is very interesting to study the effects of these con- ditions in biomedical samples. In order to have scientific results it is very important to monitor the space environment and to have a deep knowledge of the ionizing radiation environment. The commercial systems available to monitor ionizing radiations in space are very expansive. For this reason a system able to detect the ionizing radiations maintaining the cost low has been designed by GAUSS group. The idea is to build an array of photosensors, which read the light radiation produced by several crystals. The amount of incoming energy will be then read by the on board computer. Using different crystals is possible to distinguish the different kind of radiation. In particular this paper deals with a system based on four different scintillator crystals that can react to four different kind of radiation (gamma ray, X ray, high energy electron and neutron). Using this method it is possible to provide quantitative and qualitative information about radiation hitting samples. The data handling is performed by Arduino board, an open- source platform that complies with the aim to have an user-friendly university system. Another important constraint is the room available to board the detector. The idea is to develop a small system easy to board also inside a small university system such as for example a CubeLab or a CubeSat. In particular the system will be tested during the GlioLab and GlioSat missions planned to be launched on the end of 2012.