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PREPARING FOR ACTIVE PERSONAL DOSIMETRY ON THE INTERNATIONAL SPACE STATION

Abstract

A project to provide a demonstration of the first active personal dosimeter for use in the space radiation environment is planned for deployment to the International Space Station in the near future. The device is based on the Medipix pixel technology developed at CERN that was originally motivated by the needs for the Large Hadron Collider experiments. The ultimate goal is to produce a device that can measure and virtually immediately display calculated integral and current rates for dosimetric values, as well as transmit that information via wireless communication means. Data have been taken at a number of ground-based accelerator facilities including the HIMAC facility at the National Institute for Radiological Sciences in Japan to validate the capabilities of the technology to record and identify the individual tracks of charged particles from minimum ionizing through stopping Fe. Work is ongoing to determine the resolution for both charge and velocity of incident charged particles along with their Linear Energy Transfer. Software is being developed to enable the processing of the raw data on the device itself. Although the initial versions will not specifically address the potential dose due to neutrons and other neutral particles that may be present, the technology has been shown to be capable of that as well and that capability may be designed into future versions of the operational devices. The hardware that is being used for this initial demonstration will be superseded by the next generation of the technology that is being designed at CERN, and experience gained from this demonstration will be used to guide the design of future devices. The results of initial ground-based tests of the demonstration hardware will be reported..