

Evaluation of the Neutron Radiation Environment inside the International Space Station

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The Bonner Ball Neutron Detector (BBND) experiment was conducted onboard the US Laboratory Module of the International Space Station (ISS) as part of the Human Research Facility project of NASA in order to evaluate the neutron radiation environment inside the ISS. The neutron differential-energy spectra from thermal energy (0.025eV) up to 15MeV in 22 bins, and neutron dose-equivalent evaluated by using the ICRP-74 conversion coefficients were obtained with 1-minute temporal resolution over eight-month period from March through November 2001, corresponding to maximum period of solar-activity variation. The discussion of the neutron radiation environment in this presentation will be on the differences between two locations inside the ISS due to the localized shielding environment, the influence of the ISS altitude variation, and comparison with the former results obtained by the BBND pilot experiment on the STS-89 Space Shuttle flight in 1998, corresponding to the rising phase of solar-activity variation. Several solar flares associated with large proton events occurred during the BBND experiment, some of which strongly influenced the radiation environment in the ISS orbit. The influence of the most significant solar event will be also discussed.