LA-UR-16-29059
Approved for public release; distribution is unlimited.

Title: Institutional Computing Annual Report for Project w14_gpsradiation

Author(s): Sullivan, John P.

Intended for: Report

Issued: 2016-11-29

GPS Radiation Measurements Instrument Modeling and Simulation (Project w14_gpsradiation) LA-UR-16-XXXXX

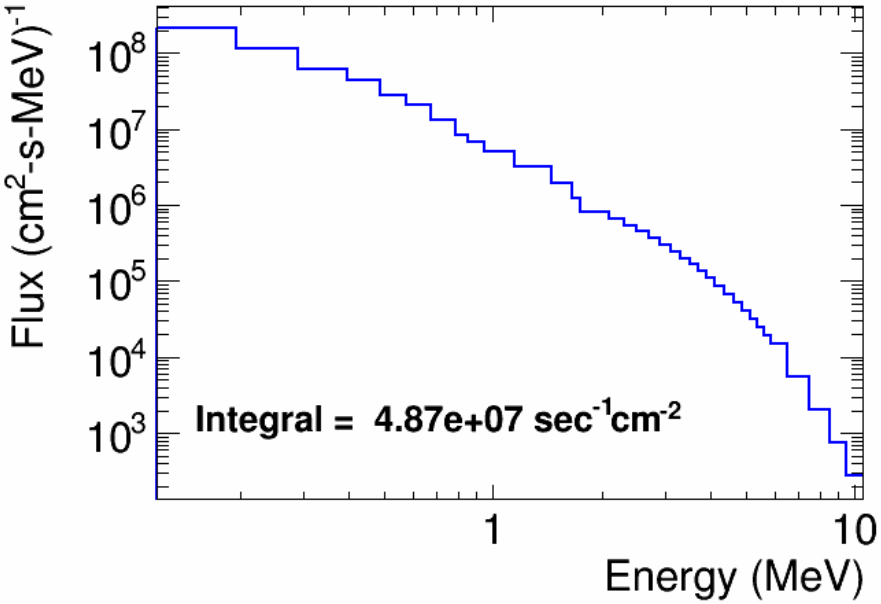
John P. Sullivan

29-Nov-2016

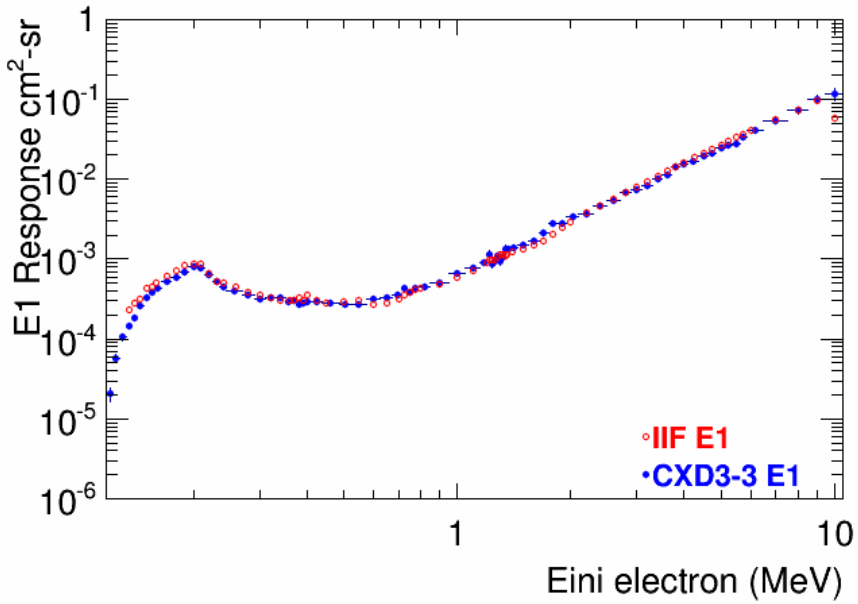
Electron response simulations

Monte Carlo calculations of the response of future charged particle instruments (dosimeters) intended to measure the flux of chrged particles in space were performed. The electron channels are called E1-E11 – each of which is intended to detect a different range of electron energies. These instruments are on current and futire GPS satellites.

- Input is electron energy distribution for GPS orbit at solar minimum (AE8MIN) with a high energy tail which falls as exp(-(E-2 MeV)/1 MeV) above 2 MeV – where E is the electron kinetic energy.



Typical calculated response



The example shows the response of the E1 channel to incident electrons. The blue points labeled “CXD3-3 E1” are the results of the calculation done by this project. The red points labeled “IIF E1” are for an older instrument which is similar but not identical. Some of the older data from these instruments can be seen on the web here: www.ndgc.noaa.gov/space-weather/satellite-data/satellite-systems/gps/