agenzia spaziale italiana

Consiglio Nazionale delle Ricerche

Università di Roma Tor Vergata

WORKSHOP

A neutron irradiation facility for space applications

Rome, 8th June 2015

Sala Cassini, Agenzia Spaziale Italiana
Via Del Politecnico snc, Roma – Tor Vergata

Cosmic rays hitting the earth's atmosphere generate showers of particles including high energy neutrons that rain down on earth. Neutrons are also produced in atmospheric events generating high energy radiation as the TGFs and in space mainly in the interaction of cosmic rays with the material of satellites and space stations. This neutron radiation can disrupt the normal operation of space, avionic and ground based electronic systems, thus representing a threat to normal operations of the devices, with problems ranging from wiping a device's memory to interrupting its normal behaviour to permanently damaging the electronics.

An adequate design and testing of the electronics is necessary to mitigate SEE disruptions, thus making the aircraft, satellites and space probes systems more reliable. In the last twenty years SEE testing has been designed and realized mainly on avionic and ground based electronic systems, for applications in transport, communications, medicine, and computing systems, where reliable and fault-free electronic systems are required in contemporary information and communication society. Chipir is a new European based facility, designed to look at how silicon microchips respond to cosmic neutron radiation. It operates at the ISIS spallation neutron source of the Rutherford Appleton Laboratory (UK). One hour exposure in the beam equivalent to hundreds to thousands of years in the real environment.

Aims of the workshop is to promote the expansion of neutron irradiation testing on Chipir to aerospace electronic systems, This is an area of growing demand where the organizers call the interest of the aerospace community. The first session of the workshop will address the cosmic radiation environment, the present performance of Chipir and the implications of cosmic neutrons on electronic systems and human tissues and cells. The second session will focus on the ESA and Italian Industry point of view and vision on the radiation evaluation, prevention and testing. All the sessions are organized in order to leave necessary time for discussion. A final wrap up session aims to draf recommendations and actions based on the discussions.

Organizing Committee

C. Andreani (Tov), R. Carpentiero (ASI), E. Flamini (ASI), R. Formaro (ASI), P.G. Rancoita (ASI), O. Schillaci (Tov), S. Sori (ASI), M. Tavani (INAF), C. Vasi (CNR).

agenzia spaziale italiana

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ASI, Sala Cassini - Via Del Politecnico snc, Roma

09.30 Registration
10.00 Welcome address
Chairperson: Enrico Flamini (ASI)
Roberto Battiston (President ASI), Giuseppe Novelli (Università Tor Vergata), Corrado Spinella (CNR)

Session 1 - NEUTRON IRRADIATION: ENVIRONMENT, EFFECTS AND TESTING

Chairperson: Carla Andreani (Università Tor Vergata)
10.30 Piergiorgio Picozza (Università Tor Vergata)
11.00 Chris Frost (ISIS, UK)
11.30 Giuseppe Gorini (Università Milano - Bicocca and CNR-IFP)
12.00 Roberto Senesi (Università Tor Vergata and CNR-IPCF)
12.30 Marco Durante (TISPA)
13:00 LUNCH
14:00 Alessandro Paccagnella (Università di Padova)
Gian Carlo Cardarilli (Università Tor Vergata)

Session 2 - THE INDUSTRY VISION

Chairperson: Marco Tavani (INAF)
14.30 Carla Signorini (ESA-ESTEC)
15.00 Piero Messidoro (Thales Alenia Space Italia)
15.30 Claudio Lanzieri (Selex ES)
16.00 Giovanni Cucinella (IMT)
16.15 Valfredo Zolesi (KAYSER Italia)

Session 3 - WRAP UP

Chairperson: Enrico Flamini (ASI)
16.30 Carla Andreani (Tor Vergata), Daniela Billi (Tor Vergata), Rita Carpentiero (ASI), Chris Frost (ISIS), Ernesto Limiti (MECSA), Piergiorgio Rancoita (ASI), Carla Signorini (ESA)
17.00 END WORKSHOP