

Radiation Source	Nature	Energy	Flux (part.cm <sup>-2</sup> s <sup>-1</sup> )	Characteristics	Remarks
Galactic Cosmic Rays	Protons (~90%) $\alpha$ (He-nucleus) & Heavy Ions (10%)	10 <sup>-2</sup> GeV-10 <sup>10</sup> GeV	2-5		Least Significant for materials
Solar Wind	Protons (96%) $\alpha$ and O-ions Electrons	~ 1KeV ~ 1 KeV ~20-40 eV	p <sup>+</sup> 2.10 <sup>8</sup> at 1A.U.	- Neutral plasma - Low energy restricts hazards to surface	No influence on circumterrestrial orbits at altitudes<6.6 R <sub>E</sub>
Solar Cosmic Events (Flares)	Protons (95%) Heavy Ions	1-100 MeV (below 10 MeV spectrum ~E <sup>-1..2</sup> , beyond ~E <sup>-5</sup> )	Precise prediction of solar activity cannot be made	- E and N particles varies by events - Omnidirectional isotropic	
Trapped Radiation 1.Inner Belts (1.2-3.2 R <sub>E</sub> )  2.Outer Belts (3-7 R <sub>E</sub> )	Protons and electrons  Protons and electrons	E <sub>p+</sub> < 30 MeV (90%) E <sub>e-</sub> < 5MeV (90%)  All E <sub>p+</sub> <1MeV	p <sup>+</sup> 5.10 <sup>5</sup> E>1 MeV e <sup>-</sup> 2.10 <sup>7</sup> E>.5MeV  p <sup>+</sup> 10 <sup>9</sup> E>10KeV e <sup>-</sup> 5.2.10 <sup>7</sup> e <sup>-5xE</sup> with E in MeV	- Omnidirectional Isotropic - Flux varies with magnetic latitude - Spectra are very variable with solar activity (GEO) - Fluxes not entirely symmetric in Longitude (SAA for protons)	- Most important for orbit at altitude <6.6 R <sub>E</sub> - High E protons in inner belts only - Atomic displacements are possible at LEO in SAA
Aurora	Electrons and protons	e <sup>-</sup> 2KeV<E<20 KeV p <sup>+</sup> 80<E<800 KeV	e <sup>-</sup> 1010 during storms p <sup>+</sup> <107	- Observed between 65° and 70° N and S magnetic latitude at altitudes between 100 and 1000 km - Very much time dependent	