

EGU22-1368

<https://doi.org/10.5194/egusphere-egu22-1368>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Determination of electron and proton fluxes in a low Earth orbit with SATRAM and comparison to EPT data

Stefan Gohl^{1,2}, Benedikt Bergmann¹, Martin Kaplan¹, and Frantisek Nemec²

¹Institute of Experimental and Applied Physics, Czech Technical University in Prague, Prague, Czechia
(stefan.gohl@utef.cvut.cz)

²Faculty of Mathematics and Physics, Charles University, Prague, Czechia

The Space Application of Timepix based Radiation Monitor (SATRAM) was launched in May 2013 onboard the Proba-V spacecraft into a low Earth orbit of 820 km. SATRAM has been measuring the radiation environment since then. Due to its pixelized structure, one can find properties in the particle tracks that identify those tracks as electrons or protons. The goal is to determine the electron and proton fluxes measured by SATRAM. The rather thick aluminium box surrounding the Timepix detector cuts off the low end of the energy spectrum for all particle species, limiting the energy range to 700 keV to 7 MeV for electrons and 15 MeV to 400 MeV for protons. For the particle identification, a neural network was utilized. It has an accuracy of about 90 % for both particle species. A Geant4 simulation was conducted to determine the efficiency of the detector for electrons and protons, respectively. Unfortunately, the proton fluxes cannot be measured that way, as the electron background is in the same order of magnitude as the number of protons. Alternatives are being discussed. Finally, the electron fluxes are compared with the data from the Energetic Particle Telescope (EPT) in the relevant energy range, which is also situated onboard the Proba-V satellite. The electron fluxes of both instruments agree with each other.