

Geant4 model calculation and energetic particle observation with HEP/Arase in the inner radiation belt

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The high-energy electron experiments (HEP) instrument installed on the Arase is designed to observe energetic electrons of 70 keV to 2 MeV. The HEP registers high electron counts for the MeV energy range, not only in the outer belt but also in the inner belt, in MeV energy range. On the contrary, Van Allen Probes have hardly detected MeV electrons in the inner radiation belt. A probable interpretation is that the counts of HEP are caused due to contamination of high-energy protons. In order to verify this idea, we have modeled the HEP instrument a Geant4 simulation to determine the energy of penetrating protons. The result clearly shows that high-energy protons, it has become clear that high-energy protons of a few to a few tens of MeV can contribute to the apparent high counts of HEP. No instrument for measuring protons in this energy range is installed on the satellite. We will discuss the possibility of research on the spatial distribution and time variation of high-energy protons in the inner belt based on observation data from the HEP instrument.

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