Spatial distribution of radiation belt protons deduced from unexpected output of HEP on board the Arase satellite

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HEP instrument on board the Arase satellite measures electrons with energies from 70 keV to 2 MeV. The Van Allen probes observation revealed that the electrons of MeV energy range never exist in the inner radiation belt. However, the HEP has detected unexpected counts even at the 2 MeV energy channel in the inner radiation belt (L < 2.0). Any contamination of high energy protons (> 30 MeV) is supposed to result in the unexpected counts. By assuming no contribution from electrons, we can obtain spatial distribution of energetic protons from the unexpected counts. The result shows a concentration on the magnetic equator especially at L > 1.5, which is basically consistent with pitch angle observation of tens of MeV protons near the magnetic equator from the Van Allen probes.

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