

# **“Earth’s Ultrarelativistic Electron Acceleration: Current Understanding and Future Exploration”**

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## **Abstract**

Earth’s radiation belts are highly dynamic regions filled with energetic charged particles. These energetic particles pose significant threats to avionics and humans in space, and understanding their dynamics has been an urgent need. The ultrarelativistic electrons ( $E > \sim 2$  MeV) represent the high energy end of radiation belt electron populations. Since the discovery of the radiation belts, how these electrons are accelerated to ultrarelativistic energies has been a long-standing question. The Van Allen Probes mission provided unprecedented differential flux measurements of radiation belt electrons, which revealed critical information about ultrarelativistic electron acceleration in the outer radiation belt. However, outstanding open questions still remain in the post Van Allen Probes era. This presentation will summarize the current understanding of ultrarelativistic electron acceleration based on Van Allen Probes observations and introduce some ongoing efforts, i.e., the development of a miniaturized high-energy-resolution relativistic electron telescope, HERT, and the associated CubeSat mission, to further explore the dynamics of this unique population.