Abstract Submitted
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High HOPEs: Modeling Electric Fields in Earth's Plasmasphere to Estimate Its Temperature[1] GRACE CORLEY, WILL FARNER, Trinity University, KEVIN GENESTRETI[2], University of Texas San Antonio, JERRY GOLDSTEIN[3], Southwest Research Institute, BRIAN LARSEN, Los Alamos National Lab, CHAE RAMNARACE, Trinity University, GEOFF REEVES, RUTH SKOUG, Los Alamos National Lab, HARLAN SPENCE, University of New Hampshire, NIESCJA TURNER, Trinity University — The plasmasphere is a region of cold, dense plasma in the Earth's inner magnetosphere and outer ionosphere. The plasma is composed of three major ion species (hydrogen, oxygen, helium), and electrons. Onboard each of the two Van Allen probes spacecraft (which pass through the plasmasphere once per orbit), the HOPE (Hydrogen Oxygen Protons Electrons) instruments count the number of particles, per position per velocity, for each ion species. These HOPE data can be fitted to an equilibrium distribution function to describe the particles in the plasmasphere. Because of the electric fields produced by when the Van Allen spacecraft perturb the ambient plasma, HOPE can only measure the high-energy tail of the plasmasphere. In order to fit the distribution function to calculate the temperature from these limited data, we constrain the open parameters, bulk velocity and density. The motion of the plasmasphere is subject to ExB drift from Earth's geomagnetic and electric fields. In this project, we model corotation and convection electric fields using solar wind data to constrain the bulk velocity of the plasmasphere.

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