

# A Method Using a CT Technique for Studying the Global Density of Earth Plasmasphere From its Remote Sensing EUV Images

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The EUV imaging of the Earth plasmasphere in the IMAGE satellite is an important and successful remote sensing method for studying the global structure of the Earth plasmasphere from the top view of the Earth plasmasphere. According to the similarity form of the projection of X-CT, with the column density of the He+ EUV Imager; we proposed a new method by using CT technique, for studying the global density of Earth plasmasphere from its EUV Images observed from the top view. Various kind of CT reconstructions algorithm had been tested, using a plasmasphere-ionosphere phantom.

Here we start our algorithm, using a fan and cone beam reconstruction, which are similar to the field of view of the EUV Imager in IMAGE satellite. Due to the limit of the field of view of the EUV imager in IMAGE satellite, we find a lot of variation structures inside and out the reconstruction figure. To make the total variation regularization in these bad conditions, various kinds of CT algorithms for the reconstruction testing had been used, and finally, we add a Total Variation algorithm, and consider within the north and south hemisphere, the plasmaspheric particles motion is symmetry. The final results indicated that the reconstruction is acceptable, so that we can start using our CT algorithm, to study the global density of the Earth plasmasphere from the EUV image data observed from IMAGE satellite, instead of a phantom. Moreover we will also present the initial results of the plasmasphere EUV studies observe from ChangE-3 in the lunar orbit.