



Soft X-ray imaging techniques for calculating the Earth's dayside boundaries

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Charged particles and neutral atoms exchange electrons in many space plasma venues. Soft X-rays are emitted when highly charged solar wind ions, such as C^{6+} , O^{7+} , and Fe^{13+} , interact with Hydrogen and Helium atoms. Soft X-ray images can be a powerful technique to remotely probe the plasma and neutral density structures created when the solar wind interacts with planetary exospheres, such as those at the Earth, Moon, Mars, Venus, and comets. The recently selected ESA-China joint spacecraft mission, "Solar wind – Magnetosphere – Ionosphere Link Explorer (SMILE)" will have a soft X-ray imager on board and provide pictures of the Earth's dayside system after its launch in 2021. In preparation for this future mission, we simulate soft X-ray images of the Earth's dayside system, using the OpenGGCM global magnetosphere MHD model and the Hodges model of the Earth's exosphere. Then, we discuss techniques to determine the location of the Earth's dayside boundaries (bow shock and magnetopause) from the soft X-ray images.