



Monitoring of dayside magnetopause position using soft X-ray images

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The interaction between heavy highly ionized solar wind ions and exospheric neutrals results in solar wind charge exchange and ensuing electromagnetic emission, usually in the extreme ultraviolet and the soft X-ray range. The strongest emission occurs in the dayside magnetosheath and magnetospheric cusps and this can be detected by X-ray telescopes. The X-ray images so obtained can be used for monitoring the dayside magnetopause and bow shock positions for long periods continuously, unlike previous in-situ spot-check measurements. However, reconstruction of the magnetopause shape using a set of 2-D images is not straightforward. We use global MHD models in order to simulate the solar wind – magnetosphere interaction and reproduce the X-ray images. We discuss how to extract information about magnetopause shape and position using these images. We set this in the context of the Solar wind Magnetosphere Ionosphere Link Explorer (SMILE) mission which is being jointly developed by ESA and the Chinese Academy of Sciences and will take into space the first soft X-ray imager specifically designed for observations of the dayside magnetosheath and cusps.