Progress in remote sensing the magnetopause and magnetosheath using low energy neutral atoms and x-rays

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Remote sensing studies with the Low Energy Neutral Atom (LENA) imager on IMAGE coupled with modeling efforts have shown that neutral atom imaging can reveal properties of the dynamics of the magnetosheath and magnetopause. In addition, observations of strong solar wind proton flux correlations with ROSAT X-ray rates along with high spectral resolution Chandra observations of X-rays from the dark Moon as well as observations of putative solar wind charge exchange observed by XMM-Newton strongly suggest that X-ray data can also be used to remote sense magnetosheath properties. In this presentation, we describe recent developments in modeling and data analysis of both neutral atom and X-ray emission from the sheath and discuss the relative strengths and complementary nature of the two techniques. We will also discuss an XMM-Newton observation likely to occur in July 2006 which will probe solar wind charge exchange emission from the Earth's magnetosheath.