Coronal Structures: Comparison between Observations and Magnetic Extrapolation

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Magnetic field plays a central role in the solar activities. At present reliable magnetic field measurements are still confined to a few lower levels, e.g., at the photosphere and the chromosphere. The Hinode and recent launched SDO provide and will provide high quality vector-magnetographic data ever obtained. The force-free condition is a good approximation in the solar corona and the nonlinear force-free field modeling of the coronal magnetic field has been extensively studied in recent years [1]. However, the results to model the coronal magnetic field based on boundary vector field measurements are still not satisfactory due to various reasons. For example, the mathematic properties of the force-free field are not well established yet. Furthermore, the data contain errors and may not be force-free. We discuss our abilities to extrapolate the coronal magnetic structures from observed data.

The work is supported by NSFC (10921303, 10778605), MOST (2006CB806301) and MOF National Major Equipment R&D Project.

Keywords: Solar corona; flares; CME; Solar Magnetic Field; .

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