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Remote sensing the solar atmosphere: Plasma diagnostics from space

R. Harrison

Space Science and Technology Department, Rutherford Appleton Laboratory, UK

Our understanding of the physics of the solar atmosphere has taken great strides forward in recent years, with the superb remote sensing capabilities of the SOHO, Yohkoh, TRACE and RHESSI missions. These missions have provided a mix of imaging and spectroscopic capability that has paved the way for a thorough investigation of plasma parameters and atmospheric topology and evolution. The techniques for plasma diagnostic investigation are reviewed in the light of recent results, especially from the SOHO spacecraft. In particular, our understanding of basic processes in the solar atmosphere are explored, as revealed by the plasma diagnostic methods, including acceleration and heating, as well as flare and mass ejection processes. Looking forward to the new generation of solar missions, including Solar-B, STEREO and Solar Orbiter, the new opportunities for plasma diagnostic techniques and the anticipated advances in our understanding of the solar atmosphere are outlined.