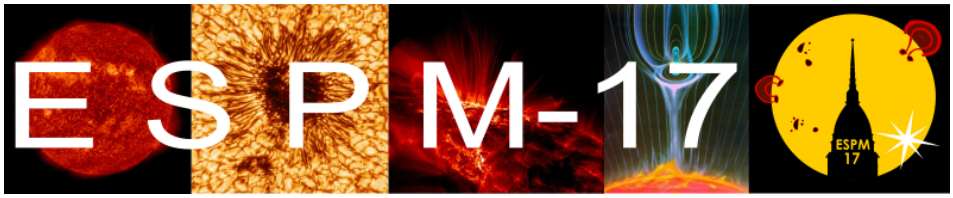

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Global Coronal Plasma Diagnostics Based on Multislit Extreme-ultraviolet Spectroscopy

Full-disk spectroscopic observations of the solar corona are highly desired to forecast solar eruptions and their impact on planets and to uncover the origin of solar wind. In this paper, we introduce a new multislit design (five slits) to obtain extreme-ultraviolet (EUV) spectra simultaneously. The selected spectrometer wavelength range (184–197 Å) contains several bright EUV lines that can be used for spectral diagnostics. The multislit approach offers an unprecedented way to efficiently obtain the global spectral data but the ambiguity from different slits should be resolved. Using a numerical simulation of the global corona, we primarily concentrate on the optimization of the disambiguation process, with the objective of extracting decomposed spectral information of six primary lines. This subsequently facilitates a comprehensive series of plasma diagnostics, including density (Fe XII 195.12/186.89 Å), Doppler velocity (Fe XII 193.51 Å), line width (Fe XII 193.51 Å), and temperature diagnostics (Fe VIII 185.21 Å, Fe X 184.54 Å, Fe XI 188.22 Å, and Fe XII 193.51 Å). We find a good agreement between the forward modeling parameters and the inverted results at the initial eruption stage of a coronal mass ejection, indicating the robustness of the decomposition method and its immense potential for global monitoring of the solar corona.

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Track Classification: Diagnostic tools and numerical methods in solar physics