Slitless Spectroscopy

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Spectrographs have traditionally suffered from the inability to obtain line intensities, widths, and Doppler shifts over large spatial regions of the Sun quickly because of the narrow instantaneous field of view. This has limited the spectroscopic analysis of rapidly varying solar features like, flares, CME eruptions, coronal jets, and reconnection regions. Imagers have provided high time resolution images of the full Sun with limited spectral resolution.

In this paper we present recent advances in deconvolving spectrally dispersed images obtained through broad slits. We use this new theoretical formulation to examine the effectiveness of various potential observing scenarios, spatial and spectral resolutions, signal to noise ratio, and other instrument characteristics.

This information will lay the foundation for a new generation of spectral imagers optimized for slitless spectral operation, while retaining the ability to obtain spectral information in transient solar events.