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Tracking spectral evolution of high-energy astrophysical plasmas through wavelet analysis SARAH J. REYNOLDS, MIKHAIL V. MEDVEDEV, SRIHARSHA S. POTHAPRAGADA, University of Kansas — High-energy astrophysical phenomena frequently produce transient, rapidly-evolving spectral features that reflect the underlying dynamics of plasma systems in which field configuration and energy distribution can vary quickly. Wavelet analysis has several advantages over standard Fourier analysis for analyzing and modeling such systems, in being able to track both time and frequency information over a range of scales. Through wavelet analysis performed on observations of several transient and explosive astrophysical phenomena such as supernovae, GRBs, and solar flares, we demonstrate the advantages of such an approach in tracking the evolving behavior of these systems. We present the extension of this approach to modeling radiation from such systems using wavelet analysis of related plasma simulations.

Sarah Reynolds
University of Kansas

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