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Multiresolution Gabor regression of transient gravitational-wave signals.[1] SERGEY KLIMENKO, University of Florida — The analysis of the gravitational-wave transient signals embedded into a non-stationary detector noise requires the identification of time-dependent spectral components in the resulting time series. This talk presents a Gabor regression method where a stack of wavelets with different windows spanning a wide range of resolutions, is used to scan power at each time-frequency location. Such a wavelet scan (or "wavescan") extends the conventional multi-resolution analysis to capture the local variations of power due to the temporal and spectral leakage. To achieve the high-resolution localization, a wavelet, least affected by the leakage, is selected from the stack at each time-frequency location. The presented method is used to obtain the high-resolution time-frequency distribution of the signal power, extract signals from noise in the wavelet domain, and reconstruct the corresponding time-domain waveforms. To demonstrate the performance of the method for detection of GW signals, the multiresolution Gabor regression is applied to the analysis of the gravitational wave data from the LIGO detectors.

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