

Fourier analysis of gapped time-series

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Abstract

In asteroseismology, gaps in the time series complicate the data analysis and hamper the precise measurement of stellar oscillation parameters, e.g. the frequencies, amplitudes, phases, and mode lifetimes. In the Fourier domain the convolution of the stellar signal with the Fourier transform of the temporal window function introduce data correlations between the different frequencies. We developed a method to derive Maximum Likelihood Estimates (MLE) of mode parameters where these data correlations are explicitly taken into account. Using simulated realisations of noisy time series with gaps, the MLE of the mode parameters of solar-like oscillations obtained with our new fitting method are more precise and less biased than the MLE determined based on the unfounded assumption of uncorrelated frequency bins.



Saskia Hekker and Torsten Stahn discussing a poster