# Use of the Lomb Periodogram to Analyze SuperDARN Backscatter Spectrum

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The Lomb periodogram method [1] is a technique for spectral analysis of non-uniformly sampled time series data. This technique is an extension of Fourier spectral analysis that involves the least-squares fitting of sine and cosine functions to the unevenly sampled time series. This technique is particularly suited to the analysis of radar backscatter in the presence of multiple targets (i.e. mixed scatter). In this study, we investigate the utility of the Lomb periodogram method for the analysis of SuperDARN data.

We present a study of the statistical properties of SuperDARN radar backscatter as determined by a modified Lomb periodogram method [2]. Using raw data obtained from the Kodiak HF radar on 20 July 2007 from 2100 to 2400 UT in a high spatial resolution mode, we analyse the temporal and spatial variability of the backscatter spectra. Finally, we compare the properties of the spectra to the spectral parameters determined by the FITACF method.

[1] N. R. Lomb, "Least squares frequency analysis unequally spaced data," Airophysics and Space Science, vol. 39, pp. 447-462, 1975.

[2] J. Koh and T. K. Sarkar, "Spectral analysis of nonuniformly sampled data using a least square method for application in multiple PRI system," Trans. IEEE, pp. 141-144, 2000.