VIRGO Science Proposal D5
Lifetimes of p-modes with wavelet analysis

Main Investigator

B. Andersen

Co-Investigators

T. Appourchaux, Ch.Wehrli, T. Toutain, (T.Leifsen UiO, A. Hanssen UiT)

Objectives

Study the lifetimes of p-modes as function of l, m and n.

Scientific rationale

The traditional method to study solar oscillation modes is based on Fourier decomposition of the signal, this method makes the assumption that oscillatory signal has constant amplitude over the observing period. The excitation and damping of p-modes has shown that this is not true. Wavelet methods assume that the signal one looks for is some sort of pulse. This is closer to the solar case for the high order p-modes.

Work plan

Some initial studies have been made using the IPHIR data. This has shown the feasibility of the method. The work will continue testing the method on IPHIR data and possibly using some of the Tenerife LOI data.

The main part of the effort will come after the initial p-modes studies have been done. A limited amount of data will be made available for the proposers not member of the VIRGO team. These data will be used for the verification and applicability of the method. After that, the method could be applied on a regular basis for the accumulating data.

Problem areas

The use of wavelet methods has shown some promise for the study of the excitation and damping of solar p-modes. The main problem is in evaluation the wavelet parameters such that an optimal resolution in time and frequency is obtained. Alternatives to the modified Morlet wavelet has to be studied.

Responsibilities

The main responsibilities for providing the spectral time series for the different combinations of l and m will be T. Appourchaux and T. Toutain for the LOI data and Ch. Wehrli for the SPM data. B. Andersen will have the responsibility for the overall management of the project and the interpretation and presentation of the data. T. Leifsen and A. Hanssen will do the main development of the code to be used.