

## Time-Distance Helioseismology

Time-distance helioseismology is a method of ambient noise imaging using the solar oscillations. The basic realization that led to time-distance helioseismology was that the temporal cross correlation of the signals at two 'surface' (or photospheric) locations should show a feature at the time lag corresponding to the subsurface travel time between the locations. The temporal cross correlation, as a function of the location separation, is the Fourier transform of the spatio-temporal power spectrum of the solar oscillations, a commonly used function in helioseismology. It is therefore likely the characteristic ridge structure of the correlation function had been seen before without appreciation of its significance.

Travel times are measured from the cross correlations. The times are sensitive to a number of important subsurface solar phenomena. These include sound speed variations, flows, and magnetic fields. There has been much interesting progress in the 17 years since the first paper on this subject (Duvall et al., *Nature*, 1993, 362, 430-432). This progress will be reviewed in this paper.