Theory of surface effects

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Abstract

It is well known that in the Sun, and in solar-like oscillators at large, there is a discrepancy between the observed frequencies of global p-modes and those obtained from stellar models. This was dubbed the surface effects, because it is due to a poor modelling of turbulent convection, and of its complex interplay with acoustic oscillations, in the superficial layers of the star. Surface effects are the main obstacle preventing us from using the individual frequencies of stars for seismic analysis and diagnosis: instead, we must settle for combinations of frequencies that are insensitive to the surface. A prohibitve amount of the seismic information provided by PLATO data for these stars would be lost along the way, making the correction of the surface effect a crucial task.

During this talk, after giving an overview of the empirical formulae used to correct the theoretical frequencies a posteriori, I will review the much needed theoretical efforts that our community has developed to describe convection/oscillation interplay more realistically, and therefore to improve on the models themselves.

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