Poster

Splinter HiRes

Multiple scattering of acoustic waves

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Convective motions near the solar surface may interact with the acoustic waves propagating in the solar medium, which is not taken into account by current helioseismic studies. However, this can affect the interpretation of the observations, since it triggers heterogeneities in the medium, thus turbulent scattering of the waves. Moreover, the timescale of variation of granulation is comparable to the period of the waves, meaning that the medium may not be assumed stationary anymore. In order to study this acoustic scattering, I look at the average and variance of scattered waves over realisations of a random medium. As a preliminary diagnosis, I use finite differences to model the propagation of acoustic waves in a 1D medium with random sound speed. The results show that multiple scattering occurs for low correlation times ($\tau < 1$ min) or strong perturbations ($\delta c > 0.1 c_0$). For granulation ($\tau \simeq 400$ s, $\delta c < 0.1 c_0$), it turns out that the stationary-medium approximation is valid.