

Abstract Submitted
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Local Helioseismology and Modeling of Impulsive Events¹ JOHN STEFAN, ALEXANDER KOSOVICHEV, New Jersey Inst of Tech — Helioseismology investigates the Sun’s interior through oscillation observations, and is composed of both local and global studies. Global helioseismology focuses on global mode oscillations of the Sun, which can be observed by effects on the surface. Local helioseismology focuses on the effects of these oscillations to the background state of the Sun, including time-dependent characteristics which help us understand the structure and processes of the solar interior. We propose a model to simulate the effects of impulsive events (so-called sunquakes) on pressure and density, as well as helioseismic waves that travel through the Sun’s interior. We are able to decompose the governing equations into one dimension, and then reconstruct solutions in 3D using spherical harmonics. Since the bulk of computation is spent on solving the differential equations, performing these calculations in 1D greatly reduces computational cost. Additionally, we employ non-reflecting boundary conditions at the solar surface to more accurately describe how acoustic waves travel in the Sun. By comparing simulations to data obtained from the Solar Dynamics Observatory (SDO), etc., we hope to identify the source height (or depth) of sunquakes and perhaps even the mechanism of excitation.

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