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Simulation of acoustic wave propagation in the sun THOMAS HARTLEP, NAGI MANSOUR, NASA/Ames Research Center, MARK MIESCH, National Center for Atmospheric Research — By analyzing the oscillations on the surface of the sun, helioseimology is able to infer information about the internal structure, composition, flow structures and magnetic activity in the solar interior. One of the profound achievement of helioseismic inversions has been for instance the mapping of the differential rotation profile of the sun as a function of latitude and radius. Helioseismology is also able to detect active regions on the far-side of the sun - the side facing away from us - before they are directly visible from earth. However, the inversion techniques are in general based on simplified models of solar oscillations which in most cases have not been fully tested. We have develop numerical methods to directly simulate the propagation the acoustic waves in the full solar sphere. In these simulations, we are studying the effects of localized variations in the speed of sound and/or magnetic fields on the acoustic oscillations. We are also performing direct tests of some of the assumptions employed by helioseismology.

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