term has been observed for the $n = 1$, $l = 17$, $\ldots$, 22 acoustic modes. The observed value for the $l = 22$ multiplet differential rotation is proportional to $\cos \theta \exp \left( \frac{\mu}{4} \right)$ where $\mu$ is a constant, we obtain a scale height of $h = (1.0 \pm 0.4) \times 10^2$ $\frac{\text{R_g}}{\text{g}}$. This shows that the observed multiplet differential rotation is confined to the outer few percent of the sun which has important implications for dynamo theories of the sun.

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52.02 Solar Diameter-Type Observations of the 160 Min Solar Oscillation: Detection and Interpretation

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The solar diameter-type observations obtained at SCLERA in 1978 and 1979 have been analyzed for evidence of the 160 min oscillation. Signals in the power spectra are observed at a frequency of 104.18 $\pm$ 0.02 Hz with a good signal-to-noise ratio. This frequency agrees well with that obtained with Doppler shift studies. It is concluded from the observed spatial properties of the eigenfunctions that $l$ and $m$ are both even. The observed amplitude of apparent limb motion is 0.4 nsec produced by changes in limb darkening function, not changes in radius. The inferred amplitude of the Eulerian perturbations in the radiation intensity and temperature are $T/\Gamma \approx 1 \times 10^{-8}$ and $T/\Gamma \approx 4 \times 10^{-9}$ respectively at the solar equatorial limb.

The interpretation of the corresponding Doppler shift studies as measuring the true surface velocity produced by the oscillation is not compatible with the amplitude derived from the solar diameter-type observations. However, it is found that the good agreement is obtained if it is assumed that the Doppler shift studies are measuring an apparent velocity produced by the combination of the effects of the surface velocity due to rotation of the sun and the above observed $T/\Gamma$. This has important implications for the theory of oscillations in the solar atmosphere and for the interpretation design of future Doppler shift observations.

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52.03 Episodic Mixing and Solar Oscillations

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Standard models of the sun do not predict perfectly every solar parameter. In particular, the predicted neutrino flux is roughly three times the measured neutrino flux emanating from the sun's interior. Researchers have realized that if you can mix hydrogen into the central regions of the sun, it will burn cooler and produce fewer neutrinos. Thus, a number of schemes for mixing have been proposed in the literature. The sun's composition profile is not a free parameter because it can affect predicted oscillation periods which can be compared with observed p- and g-mode periods. In previous work we examined the effects of slow, continuous, turbulent diffusive mixing on the periods of the sun's oscillations. We concluded that there has been very little of this type of mixing in the sun; certainly not enough to remove the neutrino flux discrepancy.

In an effort to complete the picture and circumscribe all likely mixing schemes, this work studies what effect episodically homogenizing the inner 50% of the sun's mass at 2 billion years has on the sun's oscillations. The p-mode oscillations, which are less sensitive to the deep interior of the sun, are less sensitive to central mixing. However, our p-mode trends also suggest episodic mixing has not occurred. The g-mode oscillations are determined deep in the sun's interior and they are sensitive to central mixing. Our g-mode results indicate very little, if any, episodic mixing has occurred.

We conclude that the measured periods of the sun's g- and p-mode oscillations do not allow any significant deviation from the sun's standard composition profile. This in turn means very little, if any, of the neutrino discrepancy can be resolved by invoking mixing.

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