THE HEIGHT DEPENDENCE OF GRANULAR MOTION

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Abstract

Spectrograms of Mg I-absorptions lines have been registrated at different positions of the damping wings. The corresponding heights within the atmosphere have been approximated by the Eddington-Barbier approximation. We calculated the coherence between the intensity fluctuations in the continuum and those of the higher layers. We found a rather flat gradient up to a height of 100 km and above this a steep decrease of coherence. From this result we can conclude that above a height of 100 km any fluctuations of intensity are not due to ordinary convective processes. However, up to a height of 400 km we found a coherence between the velocity of granulation and its intensity fluctuations.

NUMERICAL SIMULATIONS OF THE SOLAR GRANULATION

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Abstract

Numerical simulations of the convective granular motions in the solar photosphere are presented. Realistic background physics allows a detailed comparison with observed characteristics of the solar granulation. The numerical methods are based on a bivariate Fourier representation in the horizontal plane, combined with a cubic spline representation in the vertical direction. Using a numerical grid with 16x16x16 grid points, which cover a unit cell of dimension ≈ 3600x3600x1500 km, granular motions have been followed over several turnover times. The simulated motion shows the characteristics of granular motion. The evolution of large granules into bright rings ("Exploding granules") is a consequence of the accumulating excess pressure at the granule center, necessary to support the horizontal velocities required by the contin-

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uity equation. The increasing pressure evenutally inhibits further upward motion at the granule center, which cools radiatively and shows up as a dark center in the expanding granule.

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