Observational Evidence for Chromospheric g-mode Oscillations

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An identification and clarification of different modes of oscillations may eventually illuminate the solar neutrino problem. Particularly, the internal g-modes of the Sun are the most powerful tool for investigation of solar core, and a way to solve, for instance, the neutrino problem. We have used a high spatial and temporal resolution of long time sequence of spectra in CaII H-line obtained at the Vacuum Tower Telescope (VTT) of the Sacramento Peak Observatory on a quiet region at the center of the solar disk over a large number of bright points and network elements to search for atmospheric (chromospheric) g-mode oscillations. An important parameter of the H-line profile, intensity at ${\rm H_{2V}}$ (${\rm I_{\rm H_{2V}}}$), has been derived from a large number of line profiles at the locations of 29 bright points and 3 network elements. We derived the light curves of all the bright points and network elements for the total duration of our observations. The light curves represent the main pulse with large intensity amplitude and followed by several follower pulses with lower intensity amplitudes. The light curves of these bright points would give an impression that one can as well draw curves towards and away to the highest peak (main pulse) showing an exponential growth and decay of the amplitudes. The exponential functions have been fitted for all the light curves of the bright points and found that the slopes are more or less the same, and one value of the exponent can represent reasonably well the decay for all the cases. We find an evidence for the existence of a longer period (around 80-90 min) of oscillations apart from a well known 3-minute oscillations in bright points and 5-7 minute oscillations in network elements. We suggest that the longer period of oscillations may be related to chromospheric g-mode oscillations. \vskip 0.4cm \noindent In order to confirm the results related to long-period of oscillations, we have also analyzed a long time sequence of images obtained under high spatial and temporal resolution with TRACE Space Mission in 1600 \AA\ UV continuum. We derived the cumulative intensity values of the UV bright points. The light curves of the UV bright points have been generated. We find an evidence of longer period, of the order of 2 hours, of oscillations associated with the UV bright points at the transition region. This confirms the results obtained from CaII H -line observations, and suggest that the longer period may be related to solar atmospheric g-mode oscillations.