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DISSERTATION SUMMARY

Study of Inhomogeneities in the Solar Atmosphere

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We have analyzed a large number of Ca II H line profiles at the site of the bright points in the interior of the network using 35-min-long time-sequence spectra obtained at the Vacuum Tower Telescope (VTT) of the Sacramento Peak Observatory on a quiet region of the solar disk and studied the dynamical processes associated with these structures. Our analysis shows that the profiles can be grouped into three classes in terms of their evolutionary behavior. It is surmised that the differences in their behavior are directly linked with the inner-network photospheric magnetic points to which they have been observed to bear a spatial correspondence. The light curves of these bright points give the impression that the "main pulse," which is the upward propagating disturbance carrying energy, throws the medium within the bright point into a resonant mode of oscillation that is seen as the follower pulses. The main pulse as well as the follower pulses have identical periods of intensity oscillations, with a mean value around 190 ± 20 s.

We show that the energy transported by these main pulses at the sites of the bright points over the entire visible solar surface can account for a substantial fraction of the radiative loss from the quiet chromosphere according to current models.