

ULTRA-FINE STRUCTURE OF A SOLAR PROMINENCE AND DISCOVERY OF ALFVEN WAVE WITH HINODE SOLAR OPTICAL TELESCOPE

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A solar observation satellite Hinode (Japanese for sun rise) was launched in September 2006. Hinode carried 3 advanced solar telescopes, visible light telescope, EUV imaging spectrometer, and X-ray telescope to simultaneously observe the photosphere, chromosphere, transition region, and corona. In the performance verification phase of the Hinode spacecraft with its telescopes, we observed an active region AR10921 near the west limb of the solar disk on November 9 2006. At this point, we planned to observe spicules on the limb with a broadband filter dedicated to Ca II H line (3968Å). Ca II-H emission line (3968Å) comes from plasma with temperature of approx. 10^4 K, which is much lower than the coronal temperature of 10^{6-7} K. In addition to spectacular spicules, we find a large cloud-like structure located 10,000-20,000 km above the limb. The cloud has a very complex fine structure with dominant horizontal thread-like structure. Some features are moving horizontally and also have clear vertical oscillatory motions. The periods and amplitudes of these oscillations are 130-250 seconds and 200-850 km, respectively. The vertical oscillatory motion sometimes has a coherence length as long as 16,000 km. We conclude that from various observational features this vertical oscillation is a signature of Alfvén waves propagating along the horizontal magnetic fields. We will discuss their origin and implications.