

Solar Chromospheric Jets Observed with Hinode and the Space Weather

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Solar chromospheric jets, usually called spicules, are hair-like structures seen on the solar limb anytime in optically thick chromospheric lines such as Balmer alpha line of Hydrogen (H-alpha) and resonance lines from singly ionized Calcium (Ca II H&K). The individual spicules show jet-like features, shooting up into the hot corona ($T=10^6$ K) from the cool chromosphere ($T=10^4$ K) and are supposed to be one of main ingredients of the chromosphere. Hinode have revealed for the first time that the spicule consists of highly dynamic threads of as thin as a few tenths of arcsecond, which have dominant upward motion with a typical apparent velocity of 20 km/sec up to 100 km/sec, and shows prominent lateral movement or oscillation during its life. The Hinode observations of chromospheric jets indicate that the solar upper atmosphere is permeated by Alfvénic waves with amplitudes of order 15-25 km/s and periods of 100-400 s, and is replenished with mass. Estimates of the energy flux carried by these waves indicate that Alfvén waves can indeed accelerate the solar wind, and possibly heat the quiet corona.