Polarized Kink Waves in Magnetic Elements: Evidence for Chromospheric Helical Waves

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Abstract

In recent years, new high spatial resolution observations of the Sun's atmosphere have revealed the presence of a plethora of small-scale magnetic elements down to the resolution limit of current solar telescopes (~100—120 km on the solar photosphere). These small magnetic field concentrations, due to the granular buffeting, can support and guide several magnetohydrodynamic wave modes that would eventually contribute to the energy budget of the upper layers of the atmosphere. In this contribution I will show new results from the analysis of the horizontal velocity of magnetic elements in the solar chromosphere. By exploiting the high spatial and temporal resolution chromospheric data acquired with the Swedish 1 m Solar Telescope, and applying the empirical mode decomposition technique to the tracking of the solar magnetic features, a phase relation between the two components of the horizontal velocity vector itself is found, resulting in its helical motion.