

# STEEP MAGNETIC STRUCTURES IN THE SOLAR ATMOSPHERE

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The sub-photospheric and the lower atmospheric layers of the Sun consist of weakly ionized gas composed largely of neutral hydrogen, protons and electrons with an admixture of heavy elements. Such a three-component plasma should be described within the framework of a non-ideal magneto-hydrodynamics which includes the effects of Hall and Ambipolar diffusion. An exact steady state solution is derived for the magnetic induction equation which incorporates the Hall and the Ambipolar terms along with the resistivity due to electron-ion and electron-neutral collisions. It is found that magnetic structures of steep gradient leading to current sheets and fast dissipation of magnetic energy at the reconnection sites are formed. Clearly, these effects are likely to play an important role in providing an efficient mechanism for heating the chromosphere.