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171Å FE IX LINE PROFILES IN THE SPECTRUM OF SLOW MAGNETO-ACOUSTIC WAVES

Abstract

The study of MHD waves in coronal structures is of great importance in coronal seismology. The study of these waves makes it possible to study the physical structure and mechanism of heating of the solar corona. It is of great interest to calculate the line profile in the emission spectrum of a magnetosonic wave for various physical parameters, calculate the energy flux and compare them with observations. In this paper, the profiles of the λ171FeIX line in the emission spectrum of slow magnetosonic waves propagating in coronal loops are calculated for cases of an optically thin layer and the change in density. The line profiles were calculated for the following parameter values: wave velocity amplitude 0= 10 km/s, coronal loop width 2000 km and 5000 km, wavelength Λ= 20000 km and 50000 km, Doppler width λd=0.01Å, and at values of the angle of view and at different phases of the wave. The energy flux density is 6.22*102 erg*cm-2*s-1. The calculated values of the energy flux density strongly depend on the angle of view and on the phase of the wave and range from zero at large values of Θ to 12103 ergcm-2s-1, the values of Doppler velocities d and velocities of non-thermal movements nt at small values of Θ have a maximum value of 30 km/s and decrease almost to zero at large values of Θ. At different values of the angle of the line of sight, the asymmetry is almost not noticeable. An interesting result is that the values of the calculated (observed) energy flux can be both much less and much more than the true value: from almost zero at small values of Θ. These values depend not only on the angle of view, but also on the width of the coronal loop and the wavelength.