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The effect of compressive viscosity on the slow mode oscillations of inhomogeneous solar coronal loops

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Abstract

In this paper, the effect of compressive viscosity on the slow mode oscillation of solar corona loops is studied. The coronal loops medium are considered in low beta condition, uniform magnetic field in the presence of gravitational stratification and temperature gradient. Two-dimensional Magneto-Hydro-Dynamics (MHD) equations are perturbed about the equilibrium and thenthese equations are linearized and ultimately a second order differential equation is obtained for velocity perturbation by stretching method. In considering the appropriate boundary conditions for the differential equationis solved analytically and numerically. Oscillation Modes obtained from numerical solutions with real data from satellites such as SOHO, TRACE and SDO are compared. Results show that the gravitational layering, fluctuations in the corona loop for frequency values greater than the cutoff frequency occurs. In small longitudes, viscosity damping is strong $(Q \leq 2)$. Since the observations confirms strong damping of oscillations corona, can be said viscosity alone can justify the oscillation damping in elongated loops, the oscillation period is between 2 and 48 min, corresponds to the actual data.

Keywords: sun corona, coronal loops, slow-modeoscillations, compressive viscosity, period of oscillations, damping time

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