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MODULATION OF KINETIC ALFVEN WAVES IN AN INTERMEDIATE MAGNETOPLASMA

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We study the modulational instability (MI) of kinetic Alfven waves (KAWs) in an intermediate magnetoplasma. A set of fluid equations, coupled to the Maxwell's equations are considered to derive a coupled set of nonlinear partial differential equations (PDEs) which govern the evolution of KAWs in the plasma. We show that the KAWs can evolve into bright envelope solitons, rogons or can undergo damping depending on whether the characteristic ratio of the Alfven to ion-acoustic speeds remains above or below a critical value. The growth rate of MI, as well as the frequency shift and the energy transfer rate, are obtained and analysed. The results can be useful for understanding the existence and formation of bright envelope solitons, rogons or damping of KAW envelopes in space plasmas, e.g., interplanetary space, solar winds, etc.

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