

# Stabilization of the magnetosonic instability and destabilization of nonlinear electrostatic waves due to finite amplitude Alfvén waves in a two ion-beam plasma

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It has been shown that a large amplitude Alfvén wave can stabilize linear magnetosonic instabilities triggered by an ion beam. This phenomenon occurs for large amplitude waves above a threshold value. Here the effect of a second ion beam on the threshold amplitude for stabilization of the magnetosonic instability is studied. It is shown that the second beam modifies the threshold amplitude behavior for complete saturation of the magnetosonic instability. The effect of the second beam on the properties of purely electrostatic nonlinear instabilities triggered by the finite amplitude wave is also studied. Apart from the changes induced by the second beam on the threshold amplitude behavior, it is shown that in some cases there are two regimes of the nonlinear ion-acousticlike instability. These results should be of importance in those environments where the interplay of the two beams should not be ignored like, e.g., in the fast solar wind. © 2008 American Institute of Physics.