

Electromagnetic instabilities in a gyrotopic and nongyrotopic hybrid solar-wind-like plasma

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We study the stability of electromagnetic waves for nongyrotopic velocity distribution functions in a solar-wind-like plasma. The dispersion relation is solved numerically in closed form. On the basis of recently reported observations of such plasma distribution functions in the solar wind at 1.3 AU, we study the instabilities of transverse electromagnetic waves propagating in the direction of an external magnetic field driven by ion beams and thermal anisotropies. We show that electromagnetic waves have three instability bands in the frequency range, $0 < \omega < \omega_p$, $\omega_p < \omega < 2\omega_p$, and $2\omega_p < \omega < 3\omega_p$. Our results are illustrated by using parameters consistent with observed nongyrotopic plasma distribution function in the solar wind. Copyright 1998 by the American Geophysical Union.