

# Electromagnetic ion-beam-plasma instabilities

Gomberoff, L.

Astudillo, H. F.

It is well known that ion beam-plasma interactions can destabilize right- and left-hand polarized electromagnetic waves. However, these instabilities have been studied for frequencies less than the ion-beam gyrofrequency, with the exception of Goldstein and Wong (1987), and Brinica and Tsurutani (1988), who studied also the region of high frequencies ( $\omega > \omega_i$ , where  $\omega_i$  is the ion-beam gyrofrequency), in connection with pickup cometary ions. It has been recently demonstrated that in the cold plasma theory, left- and right-hand modes can be destabilized in a rather large range of frequency and wavenumber values. It has also been shown that, in some cases, the unstable spectrum has a band structure. We study here thermal effects on the cold modes and show that, as the temperature increases, the band structure becomes a double-humped unstable spectrum. For even larger temperatures, the double-humped structure is washed out, remaining a single-humped spectrum, but with an instability range  $w$