ABSTRACT

Using Vlasov Maxwell's model equations, we derive an alternate form dielectric tensor considering anisotropy in momentum space. The particle distribution function $f_0(\tilde{p}) = f_0(\sqrt{p^2 + \xi(\vec{p}.n)^2}$. We apply longitudinal wave geometrical conditions on the dielectric tensor and derive the dispersion relation of the wave with temperature anisotropy. After angle integrations, we obtain a general dispersion relation for any anisotropic particle distribution function. Considering Maxwell-Juttner distribution function for ultrarelativistic plasmas, we derive dispersion relation of longitudinal wave for ultrarelativistic anisotropic plasmas. The derived result show that the temperature anisotropy drastically change the propagation domain compared to the non-relativistic result.