Electromagnetic linear dispersion relation for plasma with a drift across magnetic field

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A current across the magnetic field is formed in various situations in plasma. The relative drift between ions and electrons due to the cross-field current becomes a source of various microscopic instabilities. A fully electromagnetic and kinetic linear dispersion relation for plasma with a drift across magnetic field is derived by assuming a uniform background plasma. The dielectric permittivity tensor for shifted Maxwellian velocity distributions is also presented.

Keywords: plasma waves, linear theory, dispersion relation