Circularly polarized wave propagation in magnetofluid dynamics for relativistic electron-positron plasmas

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The dispersion relation for circularly polarized electromagnetic waves propagating in the direction of an external magnetic field in a relativistic electron-positron plasma with arbitrary constant drift velocities is obtained for constant temperature in the homentropic regime. This result is an exact solution of the nonlinear magnetofluid unification field formalism introduced by S. Mahajan [Phys. Rev. Lett. 90, 035001 (2003)], where the electromagnetic and fluid fields are coupled through the relativistic enthalpy density. The behavior of electromagnetic and Alfv?n branches of the dispersion relation are discussed for different temperatures.