

EFFECT OF POROSITY ON MAGNETO GRAVITATIONAL INSTABILITY OF ROTATING TWO-COMPONENT PLASMA UNDER THE INFLUENCE OF RADIATION

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Abstract

We analyzed the effect of porosity on magneto gravitational instability of infinite homogeneous rotating two component gaseous plasma incorporating the effect of Hall current, permeability, viscosity, thermal conductivity, and radiative heat-loss functions. A general dispersion relation has been derived through relevant linearized perturbation equations. It has been observed that the condition of gravitational instability is modified to the condition of radiative instability in the presence of thermal conductivity and radiative heat-loss function. The general dispersion relation is reduced for both longitudinal and transverse mode of propagation. In the longitudinal mode of propagation the condition of instability is unaffected by the presence of porosity while, in the transverse mode of propagation porosity modifies the instability condition along with magnetic field or rotation. From the curve we find that the presence of porosity, collision frequency, and permeability has a stabilizing effect on the growth rate of Jeans instability.

Keywords: Porosity, Two-component Plasma, Radiative Heat-loss Function, Thermal conductivity, Gravitational instability.

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