Jeans Instability of a Self-Gravitating Thermally Conducting Viscoelastic Fluid with Radiative Effects

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The linear self-gravitational instability of magnetized finitely conducting viscoelastic fluid with radiative effects is investigated using the modified generalized hydrodynamic (GH) model. A general dispersion relation is derived with the help of linearized perturbation equations using the normal mode analysis method and it is discussed for longitudinal and transverse mode of propagation. In longitudinal mode of propagation, we find that Alfven mode is uncoupled with the gravitating mode. The fundamental Jeans criterion of gravitational instability is determined which depends up on thermal conductivity, radiative heat-loss function, shear viscosity and bulk viscosity while it is independent of magnetic field. The viscoelastic effect modifies the fundamental Jeans criterion of gravitational instability. Numerical calculations have been performed to see the effect of different parameters on the growth rate of the Jeans instability.

References

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