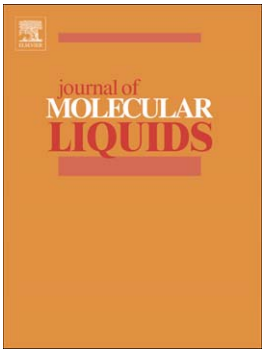

Water driven *Cu* nanoparticles between two concentric ducts with oscillatory pressure gradient

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Water Driven *Cu* Nanoparticles between two Concentric ducts with Oscillatory Pressure Gradient

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Abstract

Current study is devoted to examine the magneto-hydrodynamics (MHD) flow of water based Cu Nanoparticles with oscillatory pressure gradient between two concentric cylinders. Arrived broad, it is perceived that the inclusion of nanoparticles has increased considerably the heat transfer near the surface of both laminar and turbulent regimes. Mathematical model is constructed in the form of partial differential equations which contains the effective thermal conductivity and viscosity of base fluid and nanoparticles. Close form solution is attained corresponding to the momentum and energy equation and results are evaluated for velocity, temperature and pressure gradient in the restricted domain. Graphical results for numerical values of the flow control parameters: Hartmann number M, Reynolds number Re_ω, the solid volume fraction of nanoparticles ϕ and the pulsation parameter based on the periodic pressure gradient have been presented for the pressure difference, frictional forces, velocity profile, temperature profile, and vorticity phenomena have been discussed. The assets of various parameters on the flow quantities of observation are investigated. To the same degree a concluding crux, the streamlines are examined and plotted. The results confirmed that the velocity and temperature may be controlled with the aid of the outside magnetic field and due to the growth in the nanoparticles and considerable enhancement in the heat transfer rate can be found by adding/removing the strength of magnetic field and nanoparticle volume fraction.

Keywords: MHD, Pulsating flow, H_2O, nanofluid, MHD, concentric cylinders

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