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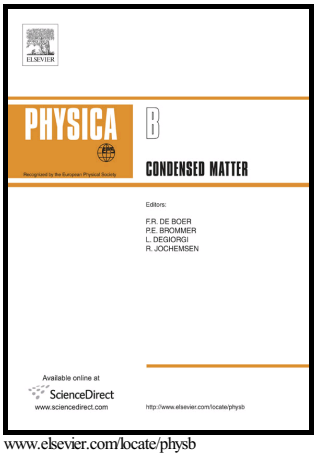

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PII: S0921-4526(17)30723-8
DOI: https://doi.org/10.1016/j.physb.2017.09.128
Reference: PHYSB310354

To appear in: *Physica B: Physics of Condensed Matter*

Received date: 28 July 2017
Revised date: 23 September 2017
Accepted date: 29 September 2017

Cite this article as: M. Waqas, T. Hayat, S.A. Shehzad and A. Alsaedi, Transport of magnetohydrodynamic nanomaterial in a stratified medium considering gyrotactic microorganisms, *Physica B: Physics of Condensed Matter,* https://doi.org/10.1016/j.physb.2017.09.128

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Transport of magnetohydrodynamic nanomaterial in a stratified medium considering gyrotactic microorganisms

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Abstract: Impact of gyrotactic microorganisms on two-dimensional (2D) stratified flow of an Oldroyd-B nanomaterial is highlighted. Applied magnetic field along with mixed convection is considered in the formulation. Theory of microorganisms is utilized just to stabilize the suspended nanoparticles through bioconvection induced by combined effects of buoyancy forces and magnetic field. Convergent series solutions for the obtained nonlinear differential systems are derived. Impacts of different emerging parameters on velocity, temperature, concentration, motile microorganisms density, density number of motile microorganisms and local Nusselt and Sherwood numbers are graphically addressed. It is observed that thermal, concentration and motile density stratification parameters result in reduction of temperature, concentration and motile microorganisms density distributions respectively.

Keywords: Gyrotactic microorgansims; Oldroyd-B fluid; Nanomaterial; Stratifications; Mixed

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