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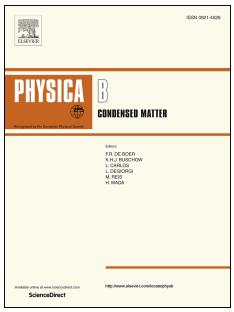

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Nanofluid heat transfer intensification in a permeable channel due to magnetic field using Lattice Boltzmann method

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Abstract

In this simulation, CuO-H_2O nanofluid flow due to Lorentz forces in a permeable channel has been reported via Lattice Boltzmann method. Homogeneous model is considered for nanofluid in which Brownian motion influence is taken into account. Isotherms and streamlines are depicted for various values of effective parameters such as CuO nanoparticles volume fraction, Reynolds number, Darcy number and Hartmann number. Results indicate that heat transfer rate enhances with increase of permeability of porous medium. Similar behavior is reported for Reynolds number. Temperature boundary layer thickness increases in existence of magnetic field.

Keywords: Magnetic field; Heat transfer augmentation; Nanofluid; Permeable channel; LBM.

Nomenclature

Ha	Hartmann number	ρ	Fluid density