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Heat Transmissions through Nanofluids and Porous Media-Impacts on Nanoscience and Nanotechnology

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One of the primary needs of industrial applications is to enhance the energy transfer rate from one medium to another. However, the use of conventional fluids sometimes limits efficient energy transfer. Thus, the dynamic process of improving heat transfer is by using nanofluids. Choi (1995) introduced a mixture of nanoscale particles and conventional fluids to enhance heat transfer efficiency to produce nanofluids. Since then, the new topic of nanofluids has received significant attention from researchers due to its importance in the science, engineering, nanotechnology, and biophysics fields.

On the other hand, convective heat transfer in a fluid-saturated porous medium plays a crucial role in geophysical (underground water, carbon dioxide sequestration, crude oil extraction, etc.) and industrial applications (refrigerators, heat sinks, thermal insulators, etc.). Heat transfer in a porous medium substantially depends on the thermal state of the porous matrix and the working fluid. When a fluid flows through a porous medium, it may be in locally thermal equilibrium (LTE) form to the porous matrix or may not. There are many situations where a thermally non-equilibrium (LTNE) state needs consideration. Here, we examine the convective heat transfer in nanofluids considering LTE and LTNE states between fluid and permeable matrix. We successfully identified the role of distinct factors in constructing a physical model dealing with flow dynamics and heat transfer.

Key words: Nanofluids, Heat and Mass Transfer, Transport in Porous Media, Magnetohydrodynamics, Non-Newtonian Fluids

Biography

Dr Mohammad Mansur Rahman is a Distinguished Professor of Applied Mathematics who has more than 23 years of teaching and research experience. Prof. Rahman is one of the leading scientists in the current era working on Nanofluids, Heat and Mass Transfer, MHD, and Transport in Porous Media. He has supervised a significant number of postgraduate and Ph.D. students. As a principal investigator, he has received many competitive research grants/projects from various funding agencies. Sultan Qaboos University awarded his research group "Modelling of Nanofluid Flows" the most active research group award. Prof. Rahman is serving many international Journals in various roles. Recently, Stanford University listed him among the World's top 2% Scientists.

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