

Seminar

Institute for Plasma Research

Title: Experimental investigation on heat transfer enhancement with nanofluids for thermal systems

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Date: 12th December 2023 (Tuesday)

Time: 10:30 AM

Venue: Seminar Hall, IPR

Abstract

The thermal efficiency of a thermal system crucially depends on the choice of the working fluid employed for energy conversion and transportation. In this context, nanofluids have emerged as pivotal players to enhance the heat transfer in various thermal applications. The nanofluid have exceptional and tuneable heat transfer characteristics. In this regard we have experimentally investigated and compared the heat transfer efficiency of various nanofluids with water. Expanding on prior research optimizing CuO-Water nanofluid at 0.03 wt.%, this study focuses on enhancing nanofluid stability. Various surfactants (GA, SLES, SDS) are analysed for their impact, with GA proving most effective. Al₂O₃ and Graphene nanopowders are introduced, maintaining stability under surfactant influence. GA-stabilized nanofluids exhibit 6-month stability, showing higher temperature rises (Graphene-Water > CuO-Water > Al₂O₃-Water) when exposed to light. Applied in a solar water heater, Graphene-Water nanofluid outperforms others, achieving up to 65°C in summer and 57°C in winter. The future studies involve the ingestion of heat transfer capabilities of hybrid nanofluids and creating a data-driven Artificial Neural Network (ANN) model for prospective thermal applications.
