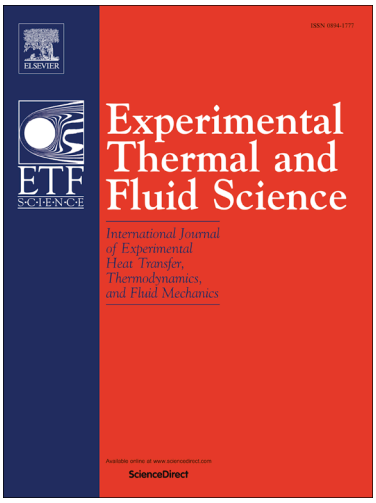


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# Estimation of local heat transfer coefficient from natural convection experiments using liquid crystal thermography and Bayesian method

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**ABSTRACT**

*In this work, an inverse methodology is developed for estimating the local heat transfer coefficients on a vertical plate embedded with the three discrete heat sources, under steady state natural convection, with the temperatures measured at the adiabatic surface without disturbing the fluid flow, using simple conduction/surrogate model and Bayesian inference. Liquid crystal thermography (LCT), an optical measurement method based on the colour-temperature relationship of thermochromic liquid crystal sheet (TLC) is used to determine the temperature field of the adiabatic surface. Bayesian framework with Metropolis Hastings-Markov chain Monte Carlo (MH-MCMC) sampling method is considered for exploring the posterior distribution to estimate the parameters in terms of point estimates like mean, Maximum a posteriori (MAP) and standard deviation. A parity plot between simulated (using retrieved parameters) and measured TLC temperatures show good agreement.*

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