磁性流體於不同長寬比之 Hele-Shaw cell 流場中熱傳研究分析

蔡睿唐、溫志湧

E-mail: 9509824@mail.dyu.edu.tw

摘 要

本研究主要是以實驗的方式，來探討磁流體於不同長寬比之 Hele-Shaw Cell 流場中受到外加均勻垂直磁場作用與下方加熱情 況下的Rayleigh-Benard 熱對流不穩定性問題。實驗方面改善先 前的實驗設備及實驗的環境條件，並延續使用全自動的資料存取 系統，及藉由高精度的電阻式加熱器與熱電偶（K-Type）來精準 地控制磁流體上下邊界的恆溫條件，及使用液晶熱像法來觀察外 加垂直磁場對流場不穩定性的影響。研究結果證明運用液晶熱像 法可將磁流體之對流流場可視化，外加磁場可使多個不同長寬比 的磁流體Hele-Shaw cell 流場之不穩定現象提前發生。研究中並 找出不同長寬比下的臨界磁場，Ramc，另外也發現了不同的 Hele-Shaw cell 厚度-長度比(Dh 比值)對Ra 值有相對的影響。

關鍵詞 : 磁流體，Hele Shaw Cell，長寬比，Rayleigh-Benard 熱對流不穩定性，液晶熱像法。磁性流體

目錄

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