

磁流體於二維矩形流場中之熱傳研究

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摘要

本研究主要是以使用液晶熱像法，來探討磁流體於 Hele-Shaw cell 與二維矩形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，在實驗方面建立一套全自動的資料存取系統，使用液晶熱像法與熱電偶來進行熱傳值量測，藉由高精度的電阻式溫度感測器控制上下加熱與冷卻系統，精準地控制上下邊界的等溫條件，並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。研究結果驗證了 Yamaguchi 等人[15]與 Wen 等人[1]於磁流體在二維矩形流場與 Hele-Shaw cell 中自然對流的不穩定性現象的結果。

關鍵詞：磁流體，自然對流，Rayleigh-Benard 不穩定性，液晶熱像法。

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