

Effect of magnetic field and non-uniform temperature gradient on Marangoni convection with free-slip bottom

ABSTRACT

The effect of magnetic field on the onset of Marangoni convection in a horizontal layer with a free-slip bottom heated from below and cooled from above with non-uniform basic temperature gradient is considered. A linear stability analysis is performed to undertake a detailed investigation. The eigenvalues are obtained for lower rigid isothermal and upper free adiabatic boundaries. The influence of various parameters on the onset of convection has been analyzed. Six non-uniform basic temperature profiles are considered and some general conclusions about their destabilizing effects are presented.

Keyword: Marangoni convection; Magnetic field; Non-uniform temperature; Free-slip