

Effect of Modulation on Thermal Convection Instability

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The linear stability problem for a fluid in a classic Benard configuration is considered. The applied temperature gradient is the sum of a steady component and a time-dependent periodic component. Only infinitesimal disturbances are considered. The time-dependent perturbation is expressed in Fourier series. The shift in critical Rayleigh number is calculated and the modulating effect of the oscillatory temperature gradient on the stability of the fluid layer is examined. Some comparison is made with known results.