



## 复旦大学数学科学学院 数学综合报告会

报告题目: On Magnetic Inhibition Theory in Bendard Problem

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时间: 2017-08-04 星期五 10:00-11:00

地点: 光华东主楼 1801

摘要: We investigate the stability and instability of the magnetic Benard problem with zero resistivity and zero heat-conduction in a horizontal strip domain, in which the upper boundary is free and the lower boundary is fixed. We establish a threshold  $a$  for the stability and instability of the magnetic Benard problem. More precisely, if  $M_3 < a$ , then the magnetic Benard problem is unstable, i.e., the convective instability occurs, where  $M_3$  denotes the third component of the impressed magnetic field. If  $M_3 > a$  and the initial perturbation of the magnetic Benard problem around an equilibrium state satisfies some relations, then the magnetic Benard problem is stable and the corresponding global solution enjoys an algebraic decay in time. Our stability result partially supports the Chandrasekhar assertion that a magnetohydrodynamic fluid of zero resistivity should be thermally stable for all adverse temperature gradients. Similar conclusion also be derived for the case of that the both of the upper and lower boundaries are fixed, where the threshold is denoted by  $b$ . We further find that  $b < a$ , which presents that the non-slip boundary condition on the upper-boundary can enhance the inhibition effect of magnetic fields. Moreover, such phenomenon also can be found in the stratified magnetic Rayleigh–Taylor problem.

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