

Subject 6

Control of chaotic transport and applications to plasma confinement

Guido Ciraolo
Ecole Centrale de Marseille,
MSNM-GP (L3M) UMR 6181
IMT La J ete - Technop ole de Ch ateau-Gombert
38, rue Fr ed eric Joliot Curie 13451 Marseille Cedex 20

In plasma physics, turbulence represents a severe obstacle to the attainment of confinement and high performance devices. Conventional methods of control aim at targeting individual trajectories. In many-body systems, such methods are hopeless and one has to design a very different strategy. In this presentation I will discuss a strategy to channel chaos by building barriers to diffusion. The core of this approach is a small apt modification of the system which drastically enhances confinement, providing practical prescriptions for the experimental apparatus to operate in a regular regime at a low additional cost of energy. This control of chaotic transport is tested to plasma conditions relevant to both small plasma experiments and that of fusion plasma experiments. Robustness of the control scheme is investigated.