



UNIVERSITÀ DI PARMA

DIPARTIMENTO DI SCIENZE MATEMATICHE, FISICHE E INFORMATICHE

<http://smfi.unipr.it>

COLLOQUIUM del Dipartimento



Data: **mercoledì 10 giugno, ore 14:30**

Relatore: Prof. **Giovanni Alberti**, Università di Pisa

Titolo: **Mixing for volume-preserving flows**

L'evento si svolgerà in modalità telematica via MS Teams. Gli interessati potranno collegarsi al Colloquium tramite link pubblicato sul sito del dipartimento <http://smfi.unipr.it>

Tutti gli interessati sono invitati a partecipare.

Organizzatori: proff. Adriano Tomassini, Alessandra Lunardi

Abstract: *In these lecture I will describe some results and open problems on the so-called "mixing phenomenon" for volume-preserving flows.*

To be precise, I will consider the flow associated to a (possibly time-dependent) divergence-free velocity field u on some ambient space X , that is, the one-parameter family $\{\Phi_t\}$ of transformation of X where $\Phi_t(x)$ is the value at time t of the solution of the ordinary differential equation $x' = u(t, x)$ with value x at time 0 .

A conjecture by A. Bressan states that, under certain quantitative assumptions on u , the "mixing scale" of the flow decays at most exponentially in time; a partial proof of this conjecture has been given by G. Crippa and C. De Lellis, but the most relevant case is still open.

Interestingly enough, there are relatively few examples of flows which exhibit such exponential decay, and I will illustrate some examples obtained in a joint work with G. Crippa and A. Mazzucato (with particular attention to the case of smooth velocity fields).

If time allows I will also discuss the connection with similar examples in discrete dynamical system, such as Arnold's map.