ESPCI
Laboratoire PMMH
10 rue Vauquelin, 75231 Paris Cedex 05

Séminaire PMMH

Bureau d'Études, Bâtiment L, 2 ème étage

Vendredi 22 décembre 2017, 11h00-12h00

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Tracer spreading at low Reynolds numbers : reversible or not ?

The reversibility of fluid velocity fields at low Reynolds numbers with respect to a change of the flow direction is well established : its may result in the reversibility of tracer spreading and mixing as may be demonstrated spectacularly in simple geometries such as Couette flows. However, at long times, this reversibility is broken by the effect of molecular diffusion : the transition between the two regimes has been studied experimentally and numerically in the related case of a plane oscillating Poiseuille flow. This transition to irreversibility will be shown to be considerably faster in the case of disordered systems such as porous media or rough fractures with no large scale heterogeneities. In addition, analyzing the irreversibility of tracer spreading appears as a sensitive tool for detecting such heterogeneities.