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Topology of Chaotic Mixing Patterns JEAN-LUC THIFFEAULT, University of Wisconsin - Madison, MATTHEW FINN, University of Adelaide, EMMANUELLE GOUILLART, Unite mixte Saint-Gobain/CNRS, TOBY HALL, University of Liverpool — A stirring device consisting of a periodic motion of rods induces a mapping of the fluid domain to itself, which can be regarded as a continuous mapping of a punctured surface. Having the rods undergo a topologically-complex motion guarantees a minimal amount of stretching of material lines, which is important for chaotic mixing. We use topological considerations to describe the nature of the injection of unmixed material into a central mixing region, which takes place at injection cusps. A topological index formula allow us to predict the possible types of unstable foliations that can arise for a fixed number of rods. See http://arxiv.org/abs/0804.2520 (Chaos, in press).

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