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Topological entropy and symbolic dynamics for three-dimensional fluid mixing KEVIN MITCHELL, BRYAN MAELFEYT, JOSHUA ARENSON, University of California, Merced — Topological entropy provides an important metric of mixing in two-dimensional fluid flows; it has led to a quantification of mixing for various periodic stirring protocols and other chaotic flows. In this context, the topological entropy can be viewed as the exponential growth rate of a material line. In this talk, we explain how one can compute an analogous entropy for topological mixing in three-dimensional flows. This entropy amounts to an exponential growth rate in the size of material sheets. Our approach involves the extraction of symbolic dynamics from the intersections of two-dimensional stable and unstable manifolds of the flow field. We illustrate our theory with a mathematical model of a chaotic ring vortex.

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