

Abstract Submitted
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Stirring fluid with ghost rods MARK STREMLER, JIE CHEN, Virginia Tech — The existence and motion of periodic orbits play an important role in fluid mixing. In many cases, periodic orbits are associated with elliptic islands and are viewed as indicators of poor mixing. However, these orbits can serve as obstacles in the flow that assist in stirring the surrounding fluid. The discussion will focus on viscous flow in lid-driven cavities. For certain system parameters, a collection of four periodic orbits - two elliptic and two hyperbolic - generate a ‘ghost rod’ structure that is similar to that of a physical rod. Analysis of the ghost rod motion can explain much of the fluid stirring. The existence, persistence, and influence of these ghost rods suggest they may play an important role in other fluid mixing systems.

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