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Symbolic Dynamics Applied to a Chaotic Spherical Vortex JOSHUA ARENSON, KEVIN MITCHELL, University of California Merced — Three-dimensional, time-periodic, volume-preserving flows are common models of complex fluid motion. These flows can exhibit chaotic dynamics with complicated geometric structures. Symbolic dynamics provides an effective tool to describe the underlying topology of these systems. One such approach that has successfully modeled fully 3D volume-preserving flows is Homotopic Lobe Dynamics (HLD). This topological technique was applied to chaotic versions of Hill's spherical vortex. An underlying assumption in past work was that the vortex zone was topologically separated from its exterior. In the present talk, we investigate a series of more challenging examples where this topological condition breaks down. We show that the HLD technique can still describe the topological features of such flows and yield an estimate of the topological entropy.

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