Taylor-Couette Flow with Hourglass Geometry of Varying Lengths Simulated by Reaction-Diffusion

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Previously, we have observed chaotic formation of Taylor-Vortex pairs in Modified Taylor-Couette Flow with Hourglass Geometry. In the experiment, the chaotic formation in a shorter system has been restricted to a narrow band about the waist of the hourglass. Such behavior has been modeled by the Reaction-Diffusion equation, which has been previously studied, by Riecke and Paap. Their calculation suggested that quadrupling the length of the system would lead to spatial chaos in the vortex formation. We present a careful recreation of this result and consider an intermediate length. We demonstrate that doubling the length should be sufficient to observe spatially chaotic behavior.

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