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Turbulent-Laminar Patterns in Shear Flows DWIGHT BARKLEY, University of Warwick — We study computationally turbulent-laminar patterns in very-large-aspect-ratio plane Couette flow. These states consist of large-scale alternations of turbulent and laminar flow oriented obliquely to the steamwise direction. Such flow patterns are now believed to be typical of many transitional shear flows when observed on long length scales. For a fixed pattern orientation of 24^{circ}, suggested by experiment, the basic scenario observed in computations as the Reynolds number is decreased is the following: From uniform turbulence there is a transition to intermittent patterns at $Re \simeq 420$, then to steady, spatially periodic patterns at $Re \simeq 390$. The wavelength increases as the Reynolds number is decreased until $Re \simeq 310$, where the flow consists of localized turbulence within a laminar background. This scenario can depend on pattern orientation – at 90^{circ} with respect to the flow direction, we observe spatio-temporal intermittency in which turbulent patches that repeatedly disappear abruptly and then re-nucleate gradually. We present an analysis of these flows in terms of mean quantities and discuss the difficulties of determining critical bifurcation parameters for such turbulent-laminar systems.

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