

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Oblique laminar-turbulent interfaces in plane shear flows

YOHANN DUGUET, LIMSI-CNRS, PHILIPP SCHLATTER, KTH-Linné Flow Centre — In many wall-bounded shear flows, turbulence can spread in the presence of finite-amplitude perturbations despite the linear stability of the base flow. The onset of the transitional regime is usually characterised by the formation of large-scale oblique patterns of alternatively laminar and turbulent flow. Yet the mechanism responsible for the observed obliqueness has so far remained mysterious. In this talk we will focus on the formation of such oblique structures in plane Couette flow, using both analytical arguments and intensive direct numerical simulations. We will suggest a robust mechanism for the obliqueness of the incipient turbulent spots derived from mass and momentum budgets in the regions close to the laminar/turbulent interfaces.

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Date submitted: 12 Aug 2012

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