

Abstract Submitted
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Enhancement of thermal fluctuations in Plane Couette Flow¹

JOSE M. ORTIZ DE ZARATE, Complutense University, JAN V. SENGERS, University of Maryland — Mode-coupling phenomena in systems outside equilibrium generically cause an enhancement of thermal fluctuations. These enhancements can be studied by Landau's fluctuating hydrodynamics. Here we present a detailed study for the case of plane Couette flow based on stochastically forced Orr-Sommerfeld and Squire equations. The forcing arises from random contributions to the stress tensor due to the stochastic nature of molecular collisions. This intrinsic stochastic forcing is then amplified by mode-coupling mechanisms associated with the shear flow. We discuss the different coupling mechanisms, the most important one being the direct coupling between fluctuations of the wall-normal velocity and vorticity. The most pronounced effect is amplification of wall-normal vorticity fluctuations with a spanwise modulation at dimensionless wave numbers q_{\parallel} around 1.5.

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