

Abstract Submitted
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The Mechanism of Polymer Drag Reduction derived from Numerical Simulations¹ YVES DUBIEF², Center for Turbulence Research, VINCENT TERRAPON, Mech. Eng. Dept, ERIC SHAQFEH, Mech. Eng. Dept & Dept. of Chem. Eng., PARVIZ MOIN, Center for Turbulence Research, Mech. Eng. Dept, Bldg 500, Stanford, CA 94305-3035 — This talk revisits the mechanism of polymer drag reduction proposed by Dubief *et al.* (*J. Fluid Mech.*, **514**, pp 271-280, 2004) derived from the observation of coherent transfers of energy between polymers and velocity fluctuations. We present further proofs of this mechanism using Lagrangian tracers to represent polymer molecules in drag reduced flows as well as controlled numerical experiments to isolate various phenomena involved in the mechanism. Turbulence reduction, impacting mainly near-wall vortices, and increase, occurring in high-speed streaks very near the wall, are found to result from the dynamics of highly stretched polymers. We will discuss various scenarios to explain the occurrence of Maximum Drag Reduction based on our mechanism.

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