

Drag Reduction by Polymers in Wall Bounded Turbulence. Authors: Victor S. L'vov, Anna Pomyalov, Itamar Procaccia and Vasil Tiberkevich.

Commentary by Leo Kadanoff , University of Chicago.

This paper describes a universal log law appropriate for boundary layers containing log-chain polymers. Such polymers can be very effective at transferring momentum over long distances and also at introducing long relaxations times into flows. Since polymers quite noticeably affect wall-drag in technically important flows, there has been a long-term interest in understanding and predicting near-wall behavior for solutions in which there are minute amounts of dissolved polymer. Important work goes back to B.A. Toms in 1949, J. L. Lumley in 1969 and M.P. Tullin in 1966. Other references can be found in this paper and the earlier work of Gregory Ryskin (Phys. Rev. Letts. Vol 59 p. 2059 (1987) and Phys. Rev. Letts. Vol 66 p. 968 (1991).)

The works of Ryskin and L'vov et. al. point to the increasing importance of non-Newtonian fluid mechanics-- situations in which the effective viscosity depends on the flow properties of the fluid.