Abstract Submitted
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Near-asymptotics overlap solutions for transport moments in turbulent channesl and boundary layers WILLIAM GEORGE, Dept. of Aeronautics, Imperial College of London, London, UK, JEAN-MARC FOUCAUT, JEAN-PHILIPPE LAVAL, Univ. Lille, Onera, CNRS, Centrale Lille, Arts et Mtiers Paris Tech, FRE 2017 - LMFL - Laboratoire de Mcanique des Fluides de Lille Kamp de Friet, — The log profile overlap solutions for turbulent channel have been complemented recently by solutions for the dissipation[1], ε and the kinetic energy[2], $\langle q^2 \rangle/2$. The dissipation varies as $1/y^+$, while the turbulence kinetic energy varies logarithmically. The Reynolds shear stress is nearly constant. We show from similar arguments that the transport moments, $T = -\langle pv \rangle/\rho - \langle q^2 v \rangle/2 + 2\nu \langle u_i s_{ij} \rangle$, also vary logarithmically. So all the terms in the kinetic energy balance in overlap region, $[\partial T/\partial y - \langle uv \rangle dU/dy - \varepsilon] = 0$, vary inversely with y^+. Boundary layer results are the power-law equivalents, but indistinguishable. Both are shown to be consistent with recent experimental and DNS data. This presents a problem for the usual eddy viscocity models for this region, $\nu_t \propto \langle q^2 \rangle^2/\varepsilon$, since both cannot be true. References: 1) Wosnik, M. *etal* (2000) JFM 421, 115; 2) Hultmark, M. (2012) JFM 707,575

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