

Abstract Submitted  
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**Linear Dynamics of Turbulent Structures in the Log Layer**<sup>1</sup> OSCAR FLORES, U. Politecnica Madrid, JAVIER JIMENEZ, U. Politecnica Madrid & CTR Stanford — The long streamwise-velocity  $u$ -structures of the log layer are analyzed using the linearized Navier-Stokes equation for a logarithmic mean velocity profile and an appropriate eddy viscosity. A concentrated wall-normal  $v$  velocity diffuses into a  $v$ -puff which leaves upstream a  $u$  “log layer streak” with an energy maximum in the wall region. The lifetime of  $v$  is short and the  $u$ -streak grows even after  $v$  decays, eventually becoming self-similar. These results compare well with the conditionally-averaged structures obtained from turbulent channels by del Álamo *et al* (2005), except that here there is no wake downstream of the puff. This suggests that the puffs are created at the tails of the streaks, leading to long  $u$ -structures containing several puffs. This is essentially the same vortex-streak cycle known to be responsible for buffer layer streaks, but acting in the log-layer with larger self-similarly growing structures. The short life of  $v$  implies that this process does not always originate at the wall. Indeed, using rough-wall profiles, the wall component weakens but the log-layer one is not affected.

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