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Linear Dynamics of Turbulent Structures in the Log Layer[1] 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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