On the outskirts of a turbulent spot in plane Couette flow MAHER LAGHA, PAUL MANNEVILLE, Ladhyx Ecole Polytechnique — Transition to turbulence in wall flows is an important problem that we approach here by simulating a partial differential Galerkin model of plane Couette flow [1] and focussing on the growth of turbulent spots. Outside a spot, numerical results show the development of large scale flow, spanning the whole gap, characterized by streamwise inflow and spanwise outflow, giving it a quadrupolar shape. The spot is associated to a region where the streamwise velocity correction is dominantly opposed to the base flow, as seen by filtering out small-scale fluctuations. The origin of the quadrupole-like flow is traced back to the shearing of this negative correction by the base flow, whereas the correction itself is generated by the appropriate component of the local average of the small-scale Reynolds stresses (streaks and streamwise vortices). The role of this large scale flow on the spot spreading mechanism is discussed.

[1] M.Lagha, P.Manneville, "Modeling plane Couette flow," Eur. Phys. J. B submitted.

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