

This paper presents a unified model of the state of edge plasma, and discusses the $L \rightarrow H$ transition and the onset of the enhanced transport characteristic of density limit regimes. The state of the electric field shear is identified as an order parameter that is applicable to, but varies across, all three regimes. Specifically, L-mode is characterized by **zonal** $E \times B$ shear, in which zonal flows, GAMs and strong turbulence coexist with relatively weak mean $E \times B$ shear. H-mode is characterized by **strong** mean $E \times B$ shear and by quenched turbulence and zonal modes. The density limit regime occurs following the **collapse** of the edge zonal $E \times B$ shear layer in L-mode. The two key elements in this picture are the two transitions — specifically the $L \rightarrow H$ transition and the transition at the onset of the density limit. These are both transport bifurcations. The former is triggered by zonal shear amplification, zonal flow noise and Reynolds stress instability, followed by the build-up of ∇P -driven $E \times B$ shear. The competition between the ion heat flux through the separatrix (which drives the flow) vs. flow damping constitutes the trigger mechanism. At the density limit, the edge $E \times B$ shear layer collapses (as in a back transition!), leading to turbulence spreading and enhanced particle transport. Electron adiabaticity is identified as a key parameter in density limit experiments, and theory and simulation both predict a drop in zonal flow shear production for adiabaticity below unity. These considerations suggest that a reduced model evolving temperature, density, zonal shear and turbulence intensity can't capture the key phenomenology of **both** the $L \rightarrow H$ transition and the density limit. More important is that it suggests: (i) that the density limit should exhibit a dependence on ion heat flux through the boundary (i.e. power drives the flow and collisionality; i.e. via adiabaticity and flow damping); (ii) that the power dependence of the density limit must be intrinsically linked to that of the $L \rightarrow H$ transition threshold (i.e. heat flux driving flows, in both cases). Details of the model, its predictions, and the interesting case of the H-mode density limit will be discussed.