

## ABSTRACT

The formation of transport barriers in fusion plasmas is studied through examination of mechanisms which can stabilize plasma turbulence and, thereby, reduce turbulence driven transport. These include the effects of  $E \times B$  velocity shear, negative central magnetic shear and the Shafranov shift. Transport barriers formed at the plasma edge and in the plasma core are considered, as well as the formation of multiple barriers. The access conditions for barrier formation are examined, particularly by considering local conditions compared to global parameters. Processes that can destroy transport barriers, such as magnetohydrodynamic (MHD) instabilities, are described. Plasmas with high confinement and good plasma stability then require effective control of plasma profiles and transport. Efforts towards real-time control of transport barriers are described.