

Edge transport barriers in magnetic fusion plasmas

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Abstract

The present level of understanding of the physics of the formation and sustainment of edge transport barriers in magnetically confined fusion plasmas is presented. The formation of edge transport barriers is studied through evolution of mechanisms which can suppress plasma turbulence and so reduce turbulent driven transport, such as $E \times B$ flow shear stabilization of turbulence. Comparisons of theoretical studies with experimental results are described including investigations of zonal flows, which are considered important for saturation and self-regulation of turbulence and turbulence-driven transport. Processes that affect the dynamics and spatial structure of the edge barrier are described with emphasis on the width of the transport barrier.