Impact of edge biasing on the cross-field transport and power spectra

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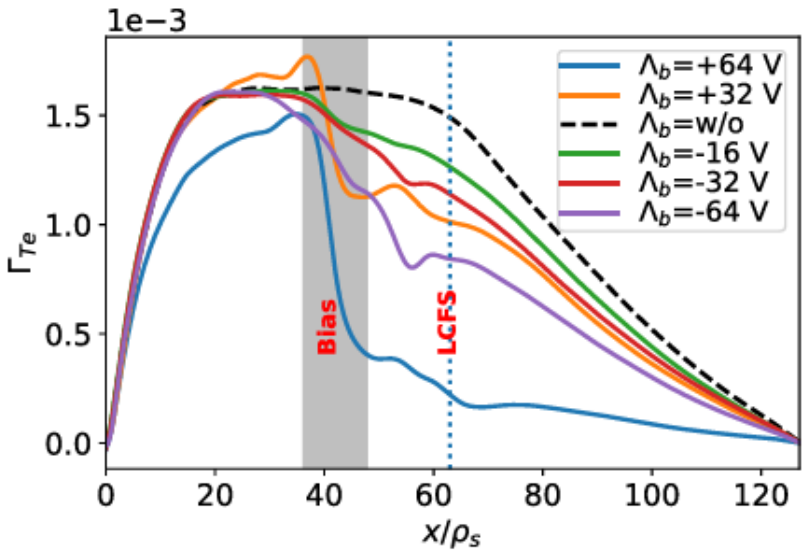

Figure Caption: The radial profile of temperature flux (Γ_{T_e}) for the biasing voltages Λ_b = +64, +32, -16, -32, -64 volts and without (w/o) biasing in the boundary region of a tokamak. The vertical dashed line represents the position of the last closed flux surface (LCFS), while the shaded region shows the biasing region. The above figure shows the reduction in Γ_{T_e} for biasing voltages compared to w/o bias. The above results has been obtained from the simulation of edge biasing.

Plasma in the boundary region of a tokamak is highly turbulent mainly due to the various types of instability such as interchange, ballooning, drift, etc. These instabilities are responsible for the radially outward transport of heat and particle fluxes that degrade the plasma confinement inside a tokamak. The confinement of the plasma is necessary for the occurrence of nuclear fusion. Various methods may control these instabilities and the transport phenomenon. One of them is edge biasing. The experimental and theoretical/numerical evidence shows that the heat and particle fluxes decrease by the edge biasing as shown in the figure. Overall plasma confinement increases.

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