The Enhanced Performance Launcher design for the ITER Upper port ECH Antenna*

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The ITER ECH heating and current drive system delivers 24MW (170GHz), which can be directed to either the equatorial (EL) or upper (UL) port launching antennas depending on the desired physics application. The UL design uses two front steering (FS) mirror that sweep eight beams in a poloidal plane providing co-ECCD over the outer half of the plasma cross section. A novel frictionless, backlash-free steering mechanism has been developed for an increased reliability and providing a steering mirror rotation of up to $\pm 7^{o}$ ($\pm 14^{o}$ for RF beam). The principle aim of the UL is to stabilize the neoclassical tearing modes (NTM), with the steering range accessing the region in which the q=3/2 or 2 flux surfaces are expected to be found for scenarios susceptible to NTMs. The steering range has been extended to access the q=1 flux surface for control of the sawtooth oscillation. Extending the range of the UL can relax the EL steering range, and optimize the launcher for enhanced performance with an optimized central deposition and potential for counter ECCD. This paper will summarize the present UL design status along with the proposed design modifications to both launcher systems for enhanced performance.

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