**Tungsten Impurity Accumulation in Advanced Tokamak Scenarios During the DIII-D Metal Tiles Campaign**

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Advanced tokamak (AT) experiments during a metal tile campaign on DIII-D showed control of core tungsten accumulation using on-axis electron cyclotron current drive (ECCD). Two AT scenarios (hybrid and high \(q_{\text{min}}\)) were tested to measure the level of impurity accumulation with tungsten sourced from the divertor. Core tungsten radiation, as indicated by SXR peaking in Fig. 1, decreases with the application of on-axis ECCD in the hybrid shot. Concomitant with the decrease in core tungsten is a decrease in rotation and electron density, an important contributor to tungsten transport \([1]\). Soft X-ray measurements show poloidally asymmetric, off-axis peaking of tungsten radiation after the application of ECCD. Tungsten radiation in the hybrid scenario with ECCD did not decrease the confinement time compared to shots with a carbon divertor. For the high \(q_{\text{min}}\) scenario, ECCD is applied off axis between \(\rho = 0.2 – 0.6\). Off-axis ECCD initially decreases rotation and electron density across the profile, and tungsten peaking is decreased compared to high \(q_{\text{min}}\) plasmas without ECCD. However, after additional beam power is applied, rotation and core tungsten radiation increase leading to the radiative collapse of the plasma. Tungsten radiation is measured by a newly installed X-ray and Extreme UV (XEUS) spectrometer. Tungsten density profiles are calculated by fitting impurity radiation in the STRAHL transport code. These results indicate that on-axis electron heating is beneficial for the operation of these AT scenarios.

TGLF/GYRO analysis is underway to find which ECCD induced profile changes are most important for controlling tungsten accumulation. *Supported by US DOE under DE-AC52-07NA27344, and DE-FC02-04ER54698.*

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