

## ABSTRACT

A novel method of current drive analysis is demonstrated that compares the measured pitch angles from motional Stark effect (MSE) spectroscopy to simulations of the expected MSE response to localized electron cyclotron current drive (ECCD). By comparing simulations of the MSE signals to measurements, the best fit of the ECCD profile is determined. The ECCD efficiency ascertained in this manner decreases as the current drive location moves to larger minor radius owing to electron trapping effects. The ECCD efficiency is shown to be highest when the driven current is on the high magnetic field side of the plasma, as expected from theory. The width of the ECCD profile is also in good agreement with theory; previous reports of a broader than expected ECCD profile are shown to be caused by the insufficient radial resolution of the magnetic equilibrium reconstruction.