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Studies of prompt losses from neutral beam injection into DIII-D[1]

D.A. SUTHERLAND, MIT, R.K. FISHER, General Atomics, D.C. PACE, ORISE Fellow, W.W. HEIDBRINK, X. CHEN, UC-Irvine — A study of the prompt losses of injected neutral beam ions was conducted on the DIII-D tokamak using the scintillator-based fast-ion loss detector (FILD) diagnostics and a reverse-orbit calculation code. Prompt losses, also called first orbit losses, result from injected neutrals that are ionized and born on orbits that intersect the outer wall. Measurements of the pitch angle and gyro-radius of the lost ions provide the input to a reverse-orbit calculation used to follow the detected ions back to their birth at the intersection of the reverse orbit with the incident neutral beam footprint. The MHz response time of the FILD scintillator allows us to compare the measured time delay between the onset of the neutral beam injection and the measured FILD loss signals, and compared this to the calculated transit time based on the path length of the reverse orbit. The effects of off-axis beam injection on the measured prompt losses will also be investigated.

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