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Absolute Impurity Concentrations During Attached and Detached Divertor Conditions in DIII-D[1] ADAM MCLEAN, STEVE ALLEN, Lawrence Livermore Natl Lab, JOSE BOEDO, UCSD, MAX FENSTERMACHER, LLNL, MATHIAS GROTH, Aalto University, HOUYANG GUO, General Atomics, ERIC HOLLMANN, UCSD, AARO JARVINEN, LLNL, CURTIS JOHNSON, Auburn University, CHARLIE LASNIER, LLNL, ANTHONY LEONARD, General Atomics, MICHAEL MAKOWSKI, WILLIAM MEYER, LLNL, AUNA MOSER, General Atomics, CAMERON SAMUELL, FILIPPO SCOTTI, VLAD SOUKHANOVSKII, LLNL, DAN THOMAS, HUIQIAN WANG, General Atomics, JON WATKINS, Sandia National Lab, DIII-D TEAM — The inter-ELM intrinsic carbon impurity fraction in DIII-D is measured to be 4.5+/-1.0% in attached H-mode conditions, falling to 0.4+/-0.1% in detached conditions, a 10X drop and a significant departure from a fixed fraction assumption. Intensity calibrated, vertically-viewing EUV/VUV spectroscopy provides line data for dominant radiation emissions in the divertor. Spectroscopic data is interpreted using Divertor Thomson scattering (DTS) for direct measurement of electron temperature and density and ADAS for simulation of emission intensities. The EUV/VUV spectrum suggests that ˜20% of the measured spectrum is unaccounted-for by line emissions alone, suggesting that molecular emissions (D_2 Lyman-Werner bands) may be present. These results provide critical benchmarks for code validation and detachment scalings, insight into divertor/scrape-off-layer (SOL) impurity transport, and reveal how efficiently the intrinsic impurity can be complemented with extrinsic sources.

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