

**Abstract Submitted for the Forty-Sixth Annual Meeting  
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Category Number and Subject: 5.6.2 DIII-D Tokamak

Theory     Experiment

**Dependence of Experimental C I Spectral Line Profiles on the Release Mechanisms of Carbon,\*** N.H. Brooks, *GA*, A.G. McLean, J.W. Davis, P.C. Stangeby, *U. Toronto*, E.M. Hollmann *UCSD* - C I emission in tokamaks is associated with the local release of carbon by physical and chemical sputtering of plasma-facing, graphitic wall components. Distinguishing between the two sputtering mechanisms by the asymmetry and width of line profiles has been reported previously [1,2]. Under detached plasma conditions, neutral carbon emission also results from volume recombination of ionic carbon transported from sources elsewhere in the tokamak. Remaining discrepancies between experimentally inferred temperatures and those predicted by modeling of the molecular breakup processes during chemical sputtering are addressed with observations of the C I profiles produced by puffing of hydrocarbon gases through a porous plug, to simulate enhanced chemical sputtering by the divertor plasma.

[1] R.C. Isler, et.al., *Phys. Plasmas* **8**, 4470 (2001).

[2] N.H. Brooks, et.al., in *Proc. of the 16<sup>th</sup> PSI Conf.*, Portland, Maine (2004), to be published.

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