

**Abstract Submitted for the Twelfth Topical Conference
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Category Number and Subject:

Theory Experiment

A Tangentially Viewing VUV TV System for the DIII-D Divertor,* D.G. Nilson,[†] M.E. Fenstermacher,[†] G. Brewis,[‡] N. Jalufka, R.T. Snider, R. Ellis,[†] *General Atomics* — A video camera system capable of imaging VUV emission, for wavelengths > 110 nm, from the entire divertor region in the DIII-D tokamak was designed. The new system has a view similar to an existing tangential camera system¹ which has produced two dimensional maps of visible line emission (400–800 nm) from deuterium and carbon in the divertor. However, the majority of the power radiated by these elements is emitted by resonance transitions in the ultraviolet, namely the C IV line at 155.0 nm and L_{α} line at 121.6 nm. To image the ultraviolet light with an angular view which includes the inner wall and outer bias ring in DIII-D, a 6-element optical system ($f/7$) was designed using a combination of reflective and refractive optics. This system will provide a spatial resolution of ~ 7 mm in the object plane. An interference filter is used to form an intermediate image of emission at a single wavelength in a secondary vacuum chamber. This is upshifted to the visible by a phosphor plate and detected with a CID camera (32 ms/frame). A single MgF_2 lens serves as the vacuum interface between the primary and secondary vacuums; another lens must be inserted in the secondary vacuum to correct the focus for different wavelengths. The optical system is designed to withstand 350°C vessel bakeout, 2 T magnetic fields, and disruption-induced accelerations of the vessel. The poloidal distribution of the VUV light will be reconstructed using the same tomographic inversion method used for the visible TV.¹

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[‡]Applied Optical.

¹Hampton University. ¹M.E. Fenstermacher, *et. al.*, Rev. Sci. Instrum., **68**, (1997), 974.

Prefer Poster Session

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Prefer Oral Session

No Preference

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_____ (Signature of APS member)

D.G. Nilson
(Same Name Typewritten)

Lawrence Livermore National

Laboratory

Special Facilities Requested (e.g., movie projector)

c/o General Atomics, P.O. Box 85608
San Diego, CA 92186-5608
(Address)

(619)455-4144/(619)455-3569
Phone/Fax

Other Special Requests

_____ nilson@gav.gat.com
_____ Email Address