

**Erratum: “Experimental determination of S / X B values of W I visible lines” [Phys. Plasmas 16, 122503 (2009)]**

D. Nishijima, R. P. Doerner, M. J. Baldwin, A. Pospieszczyk, and A. Kreter

Citation: *Physics of Plasmas* **18**, 019901 (2011); doi: 10.1063/1.3532971

View online: <http://dx.doi.org/10.1063/1.3532971>

View Table of Contents: <http://scitation.aip.org/content/aip/journal/pop/18/1?ver=pdfcov>

Published by the [AIP Publishing](#)

---

**Articles you may be interested in**

[Measurements and modeling of the impact of weak magnetic fields on the plasma properties of a planar slot antenna driven plasma source](#)

*J. Vac. Sci. Technol. A* **33**, 031303 (2015); 10.1116/1.4916018

[Influence of microwave driver coupling design on plasma density at Testbench for Ion sources Plasma Studies, a 2.45 GHz Electron Cyclotron Resonance Plasma Reactor](#)

*Rev. Sci. Instrum.* **85**, 033310 (2014); 10.1063/1.4869343

[Lithium plasma emitter for collisionless magnetized plasma experiment](#)

*Rev. Sci. Instrum.* **82**, 093502 (2011); 10.1063/1.3632981

[Experimental determination of S / X B values of W I visible lines](#)

*Phys. Plasmas* **16**, 122503 (2009); 10.1063/1.3270108

[Erratum: “Comparison of He I line intensity ratio method and electrostatic probe for electron density and temperature measurements in NAGDIS-II” \[Phys. Plasmas 13, 013301 \(2006\)\]](#)

*Phys. Plasmas* **16**, 029901 (2009); 10.1063/1.3076930

---

Did your publisher get  
**18 MILLION DOWNLOADS** in 2014?  
AIP Publishing did.



THERE'S POWER IN NUMBERS. Reach the world with AIP Publishing.



## Erratum: “Experimental determination of $S/XB$ values of W I visible lines” [Phys. Plasmas 16, 122503 (2009)]

D. Nishijima,<sup>1</sup> R. P. Doerner,<sup>1</sup> M. J. Baldwin,<sup>1</sup> A. Pospieszczyk,<sup>2</sup> and A. Kreter<sup>2</sup>

<sup>1</sup>Center for Energy Research, University of California at San Diego, 9500 Gilman Dr., La Jolla, California 92093-0417, USA

<sup>2</sup>Institute for Energy Research—Plasma Physics, Forschungszentrum Juelich, Association EURATOM-FZJ, 52425 Jülich, Germany

(Received 8 December 2010; accepted 9 December 2010; published online 3 January 2011)

[doi:10.1063/1.3532971]

We have recently remeasured  $S/XB$  values for W I lines at  $\lambda=400.8, 429.4, 498.2,$  and  $505.3$  nm at higher electron densities  $n_e$ , which was achieved by upgrading the plasma source of PISCES-B. The parameter space of  $n_e$  and electron temperature  $T_e$  for the new measurements is shown in Fig. 1 and compared with the previous values.<sup>1</sup> Under these conditions, newly measured  $S/XB$  values for the W I lines are found to be approximately five to ten times lower than the previously reported values,<sup>1</sup> as shown in Fig. 2. As a consequence, the new data for the 400.8 nm line are in good agreement with the previously reported data from other devices.<sup>2–4</sup> Compared to theoretically calculated values,<sup>5</sup> our new data are systematically lower for all the lines.

The previous data<sup>1</sup> were obtained under the plasma parameters, where the critical condition in this method (the geometrical loss flux of sputtered W atoms,  $\Gamma_W^{GL}$ , is negligible) is not satisfied. Thus, the  $S/XB$  values in Ref. 1 were overestimated. This was caused by the overestimation of the characteristic length of the system  $L$ , leading to the underestimation of  $\Gamma_W^{GL}$ . The plateau radius ( $\sim 10$  mm) of  $n_e$  ( $T_e$  is nearly flat over the plasma radius) should have been taken instead of the plasma radius of  $\sim 25$  mm. In addition, the calculated ionization mean free path of sputtered W atoms,  $\lambda_{mfp}^{calc}$ , is shorter than the actual one,  $\lambda_{mfp}^{act}$ , as shown in Fig. 2(b) of Ref. 1, because of a drop in  $n_e$  from the measured location (axial position  $z \sim 150$  mm) toward the target due to the presheath acceleration.<sup>6</sup> For the new conditions, the fraction of  $\Gamma_W^{GL}$  to the flux of sputtered W atoms,  $\Gamma_W^{Spt}$ , is estimated from  $\exp(-L/\lambda_{mfp}^{act})$  to be  $<5\%$  with  $\lambda_{mfp}^{act} = 2 \times \lambda_{mfp}^{calc}$ , while  $\Gamma_W^{GL}/\Gamma_W^{Spt}$  is up to  $\sim 40\%$  for the previous conditions.

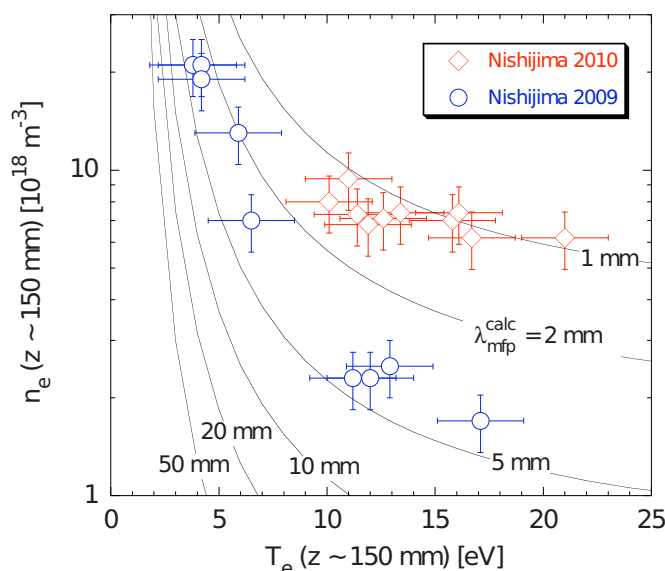


FIG. 1. (Color online)  $n_e$  vs  $T_e$  around the center of the plasma column measured at an axial position  $z \sim 150$  mm with a reciprocating double probe. Circles are taken from Ref. 1, while diamonds are newly obtained. Ionization mean free paths of sputtered W atoms,  $\lambda_{mfp}^{calc}$ , are calculated with  $n_e$  and  $T_e$  at  $z \sim 150$  mm, and are drawn by solid lines.

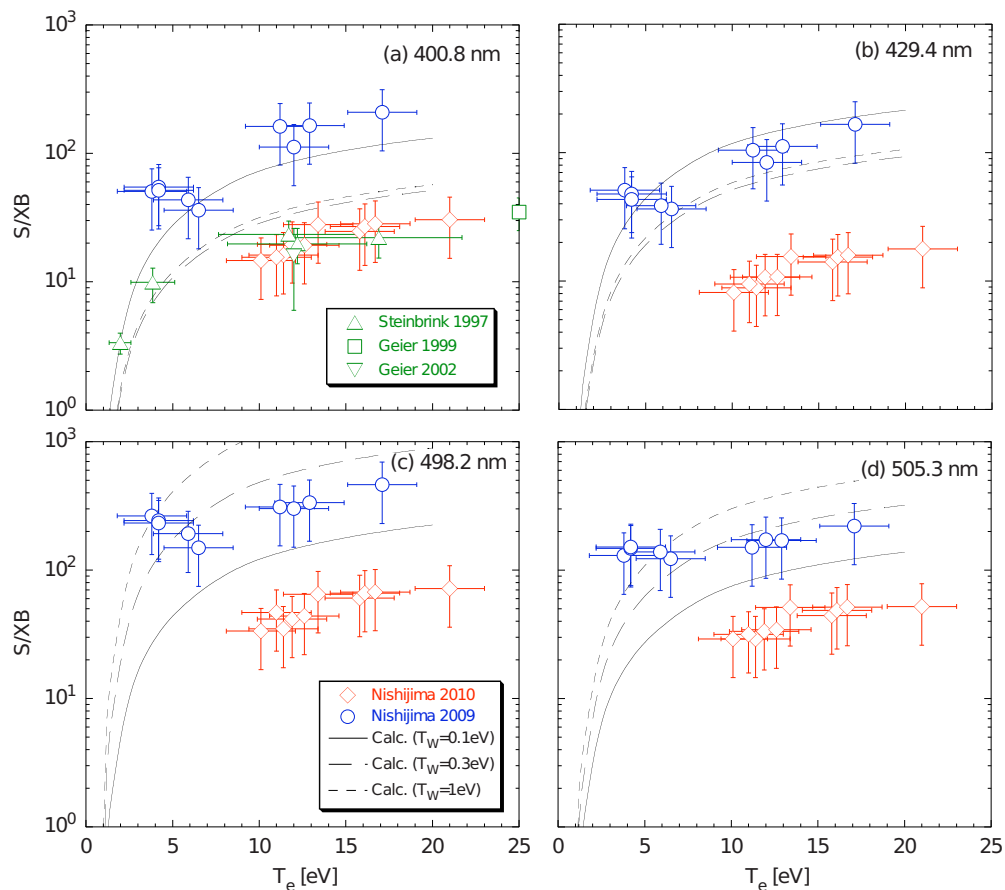


FIG. 2. (Color online)  $S/XB$  values for the W I lines: (a) 400.8, (b) 429.4, (c) 498.2, and (d) 505.3 nm. The measured data are plotted as diamonds (this work), circles (Ref. 1), triangles (Ref. 2), squares (Ref. 3), and inverse triangles (Ref. 4). The calculated data (Ref. 5) are shown by solid ( $T_W=0.1$  eV), long-dashed ( $T_W=0.3$  eV), and short-dashed ( $T_W=1$  eV) lines.

<sup>1</sup>D. Nishijima, R. P. Doerner, M. J. Baldwin, A. Pospieszczyk, and A. Kreter, *Phys. Plasmas* **16**, 122503 (2009).

<sup>2</sup>J. Steinbrink, U. Wenzel, W. Bohmeyer, G. Fussmann, and The PSI-Team, Proceedings of the 24th EPS Conference on Controlled Fusion and Plasma Physics, Berchtesgaden, Germany, 1997, Vol. 21A, Pt. IV, p. 1809.

<sup>3</sup>A. Geier, K. Asmussen, A. Bard, R. Neu, and K. Krieger, *Rev. Sci. Instrum.* **70**, 63 (1999).

<sup>4</sup>A. Geier, H. Maier, R. Neu, K. Krieger, and The ASDEX Upgrade Team, *Plasma Phys. Controlled Fusion* **44**, 2091 (2002).

<sup>5</sup>I. Beigman, A. Pospieszczyk, G. Sergienko, I. Yu. Tolstikhina, and L. Vainshtein, *Plasma Phys. Controlled Fusion* **49**, 1833 (2007).

<sup>6</sup>D. Nishijima, R. P. Doerner, D. G. Whyte, M. J. Baldwin, and T. Schwarz-Selinger, *J. Phys. B* **43**, 225701 (2010).