Erratum: Photogeneration of electrons in dust clouds in near space [Phys. Rev. E 79, 046407 (2009)]

Mahendra Singh Sodha, Amrit Dixit, and Sweta Srivastava
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In Eq. (4e) ξ should be replaced by $\xi-(Z+1)\alpha$ to take account of the charge of the particle. A term $(Z+1)\alpha$ was also needed to be deducted from the right-hand side of Eq. (4e) to account for the work done by a photoelectron to move from the surface to infinity. Tables I–III and all the figures therefore stand changed. The corrected Eq. (4e), Tables I–III, Figs. 1–5, and the corrections in Sec. V are as follows; figure captions are correct. Equation (4e) should read

$$(\varepsilon_{ph}/kT) = -(Z+1)\alpha + \left\{ \int_0^\infty \eta^2 (1+\exp\{\eta - [\xi-(Z+1)\alpha]\})^{-1} d\eta + 2(Z+1)\alpha\Phi\{[\xi-(Z+1)\alpha]\} + (Z+1)^2\alpha^2 \ln(1+\exp\{[\xi-(Z+1)\alpha]\}) \right\} \Big/ \Psi(\xi,\overline{Z+1}\alpha) = F_1(\xi,\overline{Z+1}\alpha), \tag{4e}$$

by using the identity

$$\int_{0,\xi_1+\xi_2>(Z+1)\alpha}^{\infty} \int_0^\infty (\xi_1+\xi_2)\{1+\exp(\xi_1+\xi_2-\xi)\}^{-1} d\xi_1 d\xi_2 = \int_{(Z+1)\alpha}^{\infty} \eta^2[1+\exp(\eta-\xi)]^{-1} d\eta.$$

In Sec. V, paragraph 3, in the discussion of Fig. 1, in the text (lines 6 and 7) "; it may be noticed that the mean energy of the photoelectrons increases with increasing Z and decreasing a." should be replaced by "; it may be noticed that the mean energy of the photoelectrons decreases with increasing Z and decreasing a." In the discussion of Fig. 2, in the text (lines 9–11) "It is seen that the electron temperature increases with increasing Z and decreasing a" should be replaced by "It is seen that the electron temperature decreases with increasing Z and decreasing a."

In paragraph 4, (a) in lines 1, 3, and 4 referring to Fig. 4, "n_p" should be replaced by "n." (b) The fourth and fifth sentences in the original paper, which read "Furthermore α is lower for higher values of a and hence Z decreases with increasing a. It is also seen that $Z\approx 1$ at (n/n_p) s/cm $\geqslant 100\times 10^{10}$ and the Z vs (n/n_p) curve has a very small negative slope, for higher values of n/n_p." should be replaced by "Furthermore α is lower for higher values of a and hence Z increases with increasing a. It is also seen that $Z\approx 1$ for $(n/n_p)\geqslant 225\times 10^{-10}$ s/cm and the Z vs (n/n_p) curve has a very small negative slope, for higher values of (n/n_p)."

In paragraph 5, the second sentence "The interesting result is that for large particle densities $[(n/n_p)\geqslant 100\times 10^{10}$ s/cm], (n_e/n_p) tends to saturate asymptotically to 115×10^{10} s/cm" should be replaced by "The interesting result is that for large particle densities $[(n/n_p)\geqslant 200\times 10^{-10}$ s/cm] (n_e/n_p) tends to saturate asymptotically to 220×10^{-10} s/cm."

TABLE I. $F_1=(\xi,\overline{Z+1}\alpha)$ for $1\leqslant\xi\leqslant 8$.

$\xi\rightarrow$ $(Z+1)\alpha$ $\downarrow$	1	2	3	4	5	6	7	8
1	1.73234	1.96651	2.30933	2.74097	3.261	3.77477	4.34342	4.93313
2	1.43231	1.56106	1.79139	2.12938	2.55559	3.04494	3.57764	4.14028
3	1.28821	1.34624	1.47161	1.69632	2.02678	2.44437	2.92464	3.44821
4	1.21417	1.23733	1.29404	1.41665	1.63662	1.9605	2.37022	2.84195
5	1.17184	1.18058	1.20332	1.25902	1.37946	1.59565	1.91414	2.31726
6	1.14474	1.14796	1.15657	1.17899	1.23388	1.35262	1.56579	1.87989
7	1.12569	1.12686	1.13004	1.13855	1.16071	1.21497	1.33234	1.54306
8	1.11136	1.11179	1.11296	1.11611	1.12453	1.14648	1.20022	1.31647
9	1.10009	1.10025	1.10067	1.10183	1.10496	1.11331	1.13509	1.1884
10	1.09094	1.091	1.09116	1.09158	1.09273	1.09583	1.10413	1.12576

TABLE II. $F_1=(\xi,\overline{Z+1}\alpha)$ for $9\leqslant\xi\leqslant 60$.

$\xi \rightarrow$ $(Z+1)\alpha$ $\downarrow$	9	10	15	20	30	40	50	60
1	5.53803	6.15411	9.33055	12.5829	19.1673	25.7922	32.4375	39.0876
2	4.72408	5.32328	8.44792	11.6733	18.2294	24.8397	31.4746	38.1173
3	4.00191	4.57712	7.62838	10.8145	17.3283	23.916	30.533	37.1653
4	3.35671	3.9016	6.86264	10.0005	16.4609	23.0191	29.617	36.2363
5	2.78163	3.2886	6.1435	9.22611	15.6242	22.1474	28.7248	35.33
6	2.27754	2.73567	5.46544	8.487	14.8159	21.2993	27.8512	34.4406
7	1.85357	2.24665	4.82446	7.7796	14.0335	20.4731	26.9949	33.5633
8	1.52518	1.8327	4.21803	7.10093	13.2752	19.6676	26.1574	32.6998
9	1.30372	1.51075	3.64525	6.4486	12.5391	18.8816	25.338	31.8541
10	1.17871	1.29325	3.1074	5.82069	11.8237	18.138	24.5343	31.0262

TABLE III. $F_1=(\xi,\overline{Z+1}\alpha)$ for $70\leqslant\xi\leqslant 300$.

$\xi \rightarrow$ $(Z+1)\alpha$ $\downarrow$	70	80	90	100	150	200	250	300
1	45.7381	52.3544	58.9834	65.8947	98.2935	131.018	166.614	198.15
2	44.7672	51.3854	58.0506	64.8368	97.2761	130.446	165.765	199.011
3	43.812	50.4415	57.1345	63.8029	96.352	129.744	164.54	199.884
4	42.8736	49.5158	56.2234	62.7946	95.4268	128.576	162.82	200.395
5	41.9518	78.5982	55.3038	61.8123	94.5055	127.428	161.362	199.966
6	41.0457	47.6824	54.369	60.8548	93.6061	126.829	160.658	197.953
7	40.154	46.7712	53.4304	59.9208	92.7189	126.483	160.325	194.689
8	39.2759	45.8728	52.4999	59.009	91.8461	125.745	159.643	191.947
9	38.4125	44.9915	51.587	58.1178	90.981	124.464	158.073	190.827
10	37.564	44.1268	50.6945	57.2456	90.1328	123.327	155.97	190.958

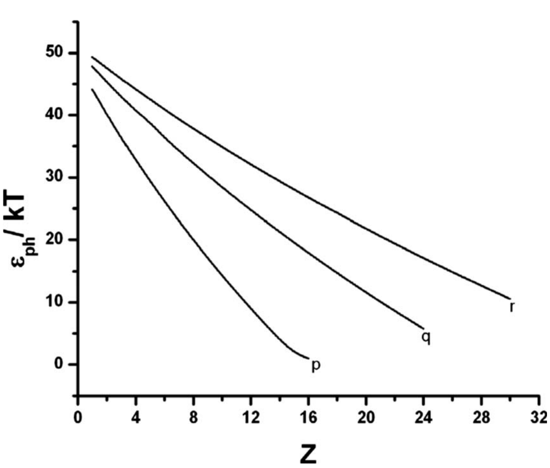

FIG. 1. Dependence of mean energy $\varepsilon_{\mathrm{ph}}/kT$ of emitted photoelectrons from a stainless-steel particle of charge Ze, irradiated by Lyman α radiation of 1215.7 Å; the letters p, q, and r refer to $a=100$, 175, and 250 Å.

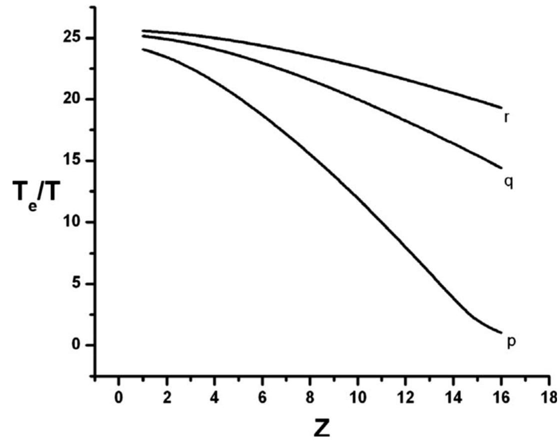

FIG. 2. Dependence of electron temperature T_e/T on Z for stainless-steel spherical particles irradiated by Lyman α radiation; the letters p, q, and r refer to $a=100$, 175, and 250 Å.

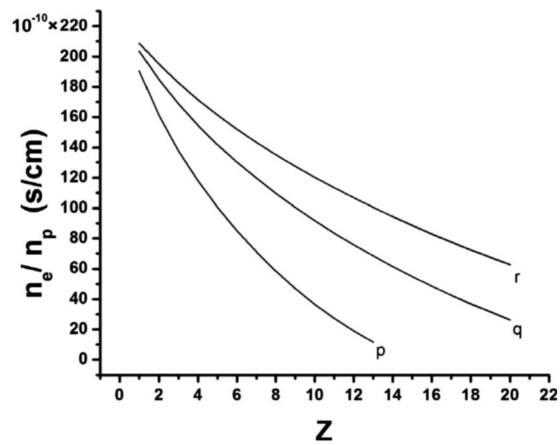

FIG. 3. Dependence of electron density n_e/n_p on Z for spherical particles, irradiated by Lyman α radiation; the letters p, q, and r refer to $a=100$, 175, and 250 Å.

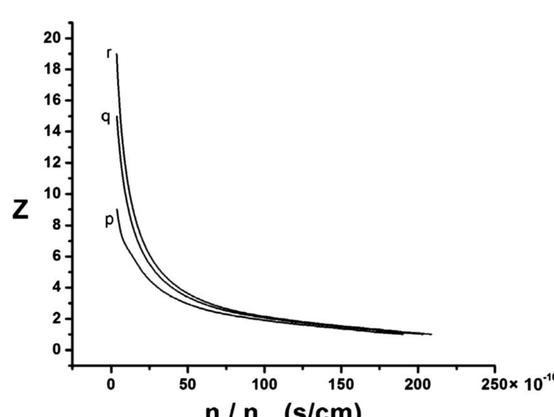

FIG. 4. Dependence of electron density Z on n/n_p for spherical particles, irradiated by Lyman α radiation; the letters p, q, and r refer to $a=100$, 175, and 250 Å.

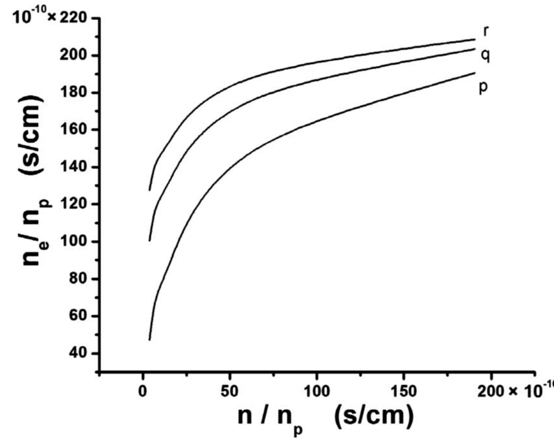

FIG. 5. Dependence of electron density n_e/n_p on n/n_p for spherical particles irradiated by Lyman α radiation; the letters p, q, and r refer to $a=100$, 175, and 250 Å.