CORRIGENDUM

Electron–photon angular correlations from the electron impact excitation of the 2s and 2p electronic configurations of atomic hydrogen

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Corrigendum

Electron-photon angular correlations from the electron impact excitation of the 2s and 2p electronic configurations of atomic hydrogen

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It was always anomalous that the data of Williams (1981) for the angular correlation parameters for an electron scattering angle of 100° for 54 eV incident electrons on atomic hydrogen were almost exactly 90° out of phase with the theoretically predicted values. This feature has been traced to a computer programming error of the coordinate system for $\theta_e \ge 90^\circ$ in a 1977 correlations fitting program which was used only for the 2p correlations studies reported in the above paper.

The error arose from the use of two identical photon detectors and occasionally two identical scattered electron detectors in the following way. The incident electron momentum, vector incident along the positive *z*-axis, together with the scattered electron momentum, defined the *xz* scattering plane in a right-handed orthogonal system, and the photon detector was normally located on the negative *x*-axis side of the *xz* plane such that $\theta_{\varepsilon} = 0$ and $\theta_{\gamma} = 180^{\circ}$. Here (θ, ϕ) are the polar and azimuthal scattering angles of the electrons $(\theta_{\varepsilon}, \phi_{\varepsilon})$ and photons $(\theta_{\gamma}, \phi_{\gamma})$. When the second electron detector was placed on the negative *x*-axis side of the *xz* plane it then defined a left-handed coordinate system. Occasionally the photon detector was rotated to $\phi_{\gamma} = 0$ for the first electron detector coordinate system which was then $\phi_{\gamma} = 180^{\circ}$ for the second electron.

That computer program, used only for the work reported in the above paper, has been resurrected because of renewed interest (Gradziel and O'Neill 2004, Bartlett *et al* 2005) in the determination of the angular and correlation parameters for excitation of the 2p level of atomic hydrogen at 54 eV. The original data, from which the λ and *R* parameters were determined, have been analysed with the corrected program. The corrected values of the λ and *R* parameters for electron scattering angles from 80 to 140 degrees, indicated in figure 1, show agreement within two standard deviations with the PECS (propagating exterior complex scaling (Bartlett *et al* 2005)) values. This correction removes what had been regarded as a main difference between measurement and theoretical values of the λ and *R* parameters for that earlier work.

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References

Bartlett P L, Stelbovics A T, Lee G M and Bray I 2005 *J. Phys. B: At. Mol. Opt. Phys.* **38** L95–8 Gradziel M L and O'Neill R W 2004 *J. Phys. B: At. Mol. Opt. Phys.* **37** 1893–1907 Williams J F 1981 *J. Phys. B: At. Mol. Phys.* **14** 1197–1217

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Figure 1. The λ and *R* parameters for exciting the 2p state of atomic hydrogen at an incident electron energy of 54 eV are shown as a function of electron scattering angle. Bartlett *et al* (2005) PECS theory, line; Williams (1981) uncorrected 10 to 70 degrees, full circles, and corrected 80 to 140 degrees, open circles.