Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Electron-impact excitation of carbon[1] OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University — The B-spline R-matrix method [1,2] is used to investigate electron-impact excitation of carbon from threshold to 60 eV. An MCHF method with non-orthogonal orbitals is employed to generate an accurate representation of the target. Our close-coupling expansion includes the bound and autoionizing states of carbon derived from the $1s^2 2s^2 2p^2$, $1s^2 2s^2 2p 3\ell$ ($\ell = 0, 1, 2$), $1s^2 2s^2 2p 4s$, $1s^2 2s 2p^3$, and $1s^2 2p^4$ configurations, plus pseudo-states to fully account for the polarizability of the ground state. Cross sections and effective collision strengths are presented for important transitions from the ground state $2p^2\ ^3P$ and the metastable $2p^2\ ^1D$ and ^1S states. Our predictions for the cross sections show significant discrepancies from those of previous calculations carried out with the standard R-matrix approach in a similar scattering model [3]. These discrepancies are due to the different target descriptions, with the present one giving overall superior agreement with experiment for energy levels and oscillator strengths. The cross sections show prominent resonance structures in the low-energy region. The energy positions, widths, and classifications for the detected resonances are presented.

[1] O. Zatsarinny and C. Froese Fischer, J. Phys. B **33**, 313 (2000).
[2] O. Zatsarinny and C. Froese Fischer, J. Phys. B **37**, 2173 (2004).
[3] K.M. Dunseath *et al.*, J. Phys. B **30, 277 (1997).**

[1]Work supported by the NSF under PHY-0244470 and PHY-0311161.

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Date submitted: 28 Jan 2005 Electronic form version 1.4