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**Photodetachment of Excited $C^-$: Angular Distributions** H.-L. ZHOU, S. T. MANSON, Georgia State University, L. VOKY, N. FEAUTRIER, Observatiore de Paris, A. HIBBERT, Queen's University Belfast — Calculations of the of the dipole photoelectron angular distribution parameter, $\beta$, resulting from the photodetachment of the excited $1s^22s^22p^3$ $^2$D state of $C^-$ have been performed using a modified R-matrix formalism [1] covering the photon energies from threshold to 11 eV, a region that includes transitions to 13 states of neutral carbon; $\beta$ has been obtained for each of them. The states investigated are: $1s^22s^22p^2$ $^3$P, $1s^22s^22p^2$ $^1$D, $1s^22s^22p^2$ $^1$S, $1s^22s^22p3s$ $^3$P, $1s^22s^22p3s$ $^1$P, $1s^22s2p^3$ $^3$D, $1s22s2p^23s$ $^1$P, $1s^22s^22p3p$ $^3$D, $1s^22s^22p3p$ $^3$S, $1s^22s^22p3p$ $^3$P, $1s^22s^22p3p$ $^1$D, $1s^22s^22p3p$ $^1$S, and $1s^22s2p^3$P. Three of the transitions, the ones to the $^1$S and $^3$S states of carbon, are parity-unfavored [2], i.e., $\beta$ = -1, independent of energy. For the other ten channels, there are significant variations with energy reflecting both the variation of the magnitudes of the dipole matrix elements with energy, along with the variation of their phases. For the transition to $1s^22s^22p^2$ $^3$P, there exists a measurement at a single energy [3], and agreement with the calculation with the experimental point is quite good. This work was supported by DOE, NSF and IDRIS. [1] H.-L. Zhou, *et al*, Phys. Rev. A **70**, 022713 (2004) and references therein. [2] S. T. Manson and A. F. Starace, Rev. Mod. Phys. **54**, 389 (1982). [3] D. J. Pegg, C. Y. Tang, J. Dellwo and G. D. Alton, J. Phys. B **26**, L789 (1993).

S. T. Manson

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