

Abstract Submitted
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K-Shell Photodetachment of Excited C^- H.-L. ZHOU, S.T. MANSON, Georgia State University, L. VOKY, N. FEAUTRIER, Observatoire de Paris, A. HIBBERT, Queen's University Belfast — Photodetachment of K-shells of negative ions have been of significant interest, both experimentally and theoretically [1-3], with a variety of new phenomenology uncovered. The phenomenology is due largely to the elastic and inelastic collisions suffered by the inner-shell photoelectron in exiting the system through the electron cloud formed by the outer-shell electrons. It is, thus, of interest to investigate how the K-shell photodetachment is changed when the outer-shell electron cloud is altered, i.e., when the negative ion is in an excited state. C^- is one of the few negative atomic ions with a bound excited state. The ground state is $1s^2 2s^2 2p^3 \ ^4S$ and the excited state is the 2D multiplet of the same configuration. Calculations of the photodetachment cross section for this excited state of C^- have been performed and compared with previous work on the ground state of C^- [4,5]. Significant differences are found. This work was supported by DOE, NSF, NASA and IDRIS. [1] N. Berrah, *et al*, Phys. Rev. Lett. **87**, 25300 (2001). [2] N. Berrah, *et al*, Phys. Rev. Lett. **88**, 093001 (2002). [3] H. Kjeldsen, *et al*, J. Phys. B **34** L353 (2001). [4] H.-L. Zhou, S. T. Manson, L. VoKy and A. Hibbert, Bull. Am. Phys. Soc. **48**, 97 (2003). [5] N. D. Gibson, *et al*, Phys. Rev. A **67**, 030703 (2003).

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