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## Multiple Photoionization of C60<sup>1</sup>

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Relative  $C_{60}^{2+}/C_{60}^+$ ,  $C_{60}^{3+}/C_{60}^+$ , and  $C_{60}^{4+}/C_{60}^+$  photoionization cross-section curves have been obtained using monochromatized light of the Synchrotron Radiation Center in the energy range between the double-ionization threshold (19 eV) and K-shell excitations (284 eV). In addition, we have measured the photoionization-induced fragmentation of  $C_{60}$  for different charge states. Our measurements are a great improvement to existing data <sup>2</sup> <sup>3</sup> regarding energy range and accuracy. Of particular interest is the  $C_{60}^{2+}/C_{60}^+$  ratio curve that surprisingly exhibits a modulation with local enhancements of the ratio at certain excess energies (= photon energy minus double-ionization threshold). Our data analysis reveals that one of the two photoelectrons created in the double photoionization process has a de Broglie wavelength, calculated for each of the ratio-enhanced excess energies, that matches a certain distance in the  $C_{60}$  cluster. These distances can be associated with the  $C_{60}$  cluster's diameter, the diameter of a hexagon, and the distance between two neighboring carbon atoms <sup>4</sup>.

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<sup>2</sup>T. Drewello *et al.*, Int. Journal of Mass Spectrom. and Ion Processes **124**, R1 (1993).

<sup>3</sup>A. Reinköster *et al.*, J. Phys. B **37**, 2135 (2004).

<sup>4</sup>P.N. Juranic *et al.*, Phys. Rev. Lett. **96**, 023001 (2006).