Abstract Submitted
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Photoexcitation of a Volume Plasmon in C_{60} Ions[1] R.A. PHANEUF, E.D. EMMONS, M.F. GHARAIBEH, Univ. of Nevada, Reno, A.L.D. KILCOYNE, A.S. SCHLACHTER, Advanced Light Source, LBNL, S. SCHIPPERS, A. MUELLER, Univ. of Giessen, Germany, H.S. CHAKRABORTY, M.E. MADJET, J.M. ROST, Max Planck Institute for Complex Systems, Dresden, Germany, S.W.J. SCULLY, Queen's Univ., Belfast, U.K. — Neutral C_{60} is well known to exhibit a giant resonance in its photon absorption spectrum near 20 eV. This is associated with a surface plasmon, where delocalized electrons oscillate as a whole relative to the ionic cage. Absolute photoionization cross-section measurements made at the Advanced Light Source for C_{60}^{+}, C_{60}^{2+} and C_{60}^{3+} ions in the 17-75 eV energy range show an additional broad resonance near 40 eV. Time-dependent density functional theory calculations confirm the collective nature of this feature, which is characterized as a dipole-excited volume plasmon made possible by the special fullerene geometry of a charged spherical shell.

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