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Angular resolved photoionization of C_{60} by femtosecond laser pulses HUI LI, ZHENHUA WANG, Kansas State University, FREDERIK SUESSMANN, SERGEY ZHEREBTSOV, Max-Planck Institut for Quantumoptik, SLAWOMIR SKRUSZEWICZ, JOSEF TIGGESBAEUMKER, THOMAS FENNEL, KARL-HEINZ MEIWES-BROER, University of Rostock, C. LEWIS COCKE, Kansas State University, MATTHIAS KLING, Kansas State University and Max-Planck Institut for Quantumoptik, JRM LABORATORY, KANSAS STATE UNIVERSITY TEAM, UNIVERSITY OF ROSTOCK COLLABORATION, MAX-PLANCK INSTITUT FOR QUANTUMOPTIK COLLABORATION — Neutral C_{60} molecules are ionized by intense femtosecond laser pulses around the wavelength of 800 nm with pulse durations 4 fs and 30 fs. We measure photoelectrons utilizing velocity-map imaging (VMI) and analyze the photoelectron angular distributions. For particular photoelectron energies, these distributions might reflect the excitation and ionization of superatomic molecular orbitals (SAMOs) which have been theoretically predicted and only recently experimentally observed. SAMOs arise from the hollow core spherical structures of the C_{60} molecules and differ from Rydberg states of C_{60} by their potential to exhibit electron density within the C_{60} cage. We have recorded the carrier envelope phase (CEP) dependence of the electron emission for 4 fs pulses using single shot CEP-tagging. The CEP-dependent asymmetry in the electron emission is observed to strongly depend on the laser polarization. Furthermore, the amplitudes and phases of the CEP-dependent electron emission are analyzed and show that thermal electron emission can be avoided enabling a more direct comparison to theory.

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