Multiphoton Rabi Oscillations of Correlated Electrons in Strong Field Nonsequential Double Ionization

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(Submitted on 8 Jul 2011)

With quantum calculations, we have investigated the multiphoton nonsequential double ionization of helium atoms in intense laser fields at ultraviolet wavelengths. Very surprisingly, we find a so-far unobserved double-circle structure in the correlated electron momentum spectra. The double-circle structure essentially reveals multiphoton Rabi oscillations of two electrons, which are strongly supported by the oscillating population of a certain doubly excited state and by the oscillating double ionization signals. This two-electron multiphoton Rabi effect provides profound understandings of electronic correlations and complicated multiphoton phenomena and is expected to be a new tool for broad applications, such as quantum coherent control.

Comments: 5 pages, 5 figures
Subjects: **Atomic Physics (physics.atom-ph)**; Optics (physics.optics)
Cite as: **arXiv:1107.1668 [physics.atom-ph]**
(or **arXiv:1107.1668v1 [physics.atom-ph]** for this version)

Submission history

From: Peixiang Lu [view email]
[v1] Fri, 8 Jul 2011 16:10:05 GMT (940kb)

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