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Angular and Intensity Dependent Spectral Modulations in High Harmonics from N_2[1] BRIAN MCFARLAND, JOSEPH FARRELL, PHILIP BUCKSBAUM, MARKUS GUEHR, Stanford PULSE Institute — The spectral amplitude and phase modulation of high harmonics (HHG) in molecules provides important clues to molecular structure and dynamics in strong laser fields. We have studied these effects in aligned N_2. Earlier results of HHG experiments claimed that the spectral amplitude modulation was predominantly due to geometrical interference between the recombining electron and the highest occupied molecular orbital (HOMO) [1]. We report evidence that contradicts this simple view. We observe a phase jump accompanied by a spectral minimum for HHG in aligned N_2. The minimum shifts to lower harmonics as the angle between the molecular axis and harmonic generation polarization increases, and shifts to higher harmonics with increasing harmonic generation intensity. The features observed cannot be fully explained by a geometrical model. We discuss alternative explanations involving multi orbital effects [2].
[1] Lein et al., Phys. Rev. A, 66, 023805 (2002) [2] B. K. McFarland, J. P. Farrell, P. H. Bucksbaum and M. Gühr, Science 322, 1232 (2008)

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