Abstract Submitted
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Probing the giant resonance in Xe via HHG with sub-two cycle 1.8 μm laser pulses[1] FRANCOIS LEGARE, INRS-EMT, ANDREW D. SHINER, NRC/University of Ottawa, BRUNO E. SCHMIDT, INRS-EMT/University of Ottawa, CARLOS TRALLERO-HERRERO, Kansas State University, HANS J. WORNER, ETH Zurich, SERGUEI PATCHKOVSKII, NRC, JEAN-CLAUDE KIEFFER, INRS-EMT, PAUL B. CORKUM, University of Ottawa/NRC, DAVID M. VILLENEUVE, NRC — We present high harmonic spectra of xenon obtained with a 1.8 μm sub 2 cycle laser source [1]. These spectra contain features due to collective multi-electron effects involving inner shell electrons, in particular the giant resonance at 100eV. This demonstrates a new class of collective electronic dynamics, induced and probed by the recombining electron. The large enhancement seen at 100 eV is recognized from photoionization studies as the xenon giant resonance [2]. In HHG, this enhancement is the result of a Coulomb interaction between the returning continuum electron and a bound 4d electron which is subsequently promoted to fill the 5p hole. The hole is later filled by the continuum electron and an XUV photon is emitted. This represents the first time that e-e correlations and excitation of the ion have been observed in gas phase HHG [3].

[1] B.E. Schmidt et al. App. Phys. Lett. 96, 071111 (2010).
[2] M. Ya Amusia and J-P. Connerade, Rep. Prog. Phys. 63, 41 (2000).
[3] A. D. Shiner et al. accepted to Nature Phys. (2011).

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