Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

High flux table-top ultrafast soft X-ray source generated by high harmonic generation NICOLAS THIRÉ, INRS-EMT/ALLS, BRUNO E. SCHMIDT, SYLVAIN FOURMEAUX, SAMUEL BEAULIEU, VINCENT CARDIN, INRS-EMT, MATTEO NEGRO, CNR - Istituto di Fotonica e Nanotecnologie, JEAN-CLAUDE KIEFFER, INRS-EMT, CATERINA VOZZI, CNR - Istituto di Fotonica e Nanotecnologie, FRANÇOIS LEGARE, INRS-EMT — Generation of ultrafast soft X-ray pulses is a major challenge for conventional laboratories. Using the process of HHG enables generation of such short wavelength photons. Intense laser sources in the infrared are necessary to reach the soft X-ray spectral range as the HHG cut-off scales with $I\lambda^2$. However, in the limit of the single atom response, increasing the laser wavelength leads to a significant decrease of the HHG flux. To compensate, one has to increase the number of emitters with high ionization potential. At the Advanced Laser Light Source, we have addressed this challenge by using a new gas cell design and developing a 10 mJ - 30 fs source at 1.8 μm. Using this setup, we have been able to generate harmonics in the water window spectral range for neon and helium with short time duration (<30 fs) in a conventional laboratory. A flux measurement has been performed showing $\sim 2 \times 10^5$ photons/shot between 280 and 540 eV, making it possible to see the carbon k-edge at 280eV in a single shot manner. This soft X-ray beam is also extremely well collimated (0.1 mrad) making it this table-top beamline ideal for a number of applications.

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Date submitted: 23 Jan 2014 Electronic form version 1.4