

Abstract Submitted  
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**Single-Shot Wavefront Measurement of an Injection-seeded Plasma-based Soft X-Ray Laser**<sup>1</sup> S. WANG, Colorado State University, L. LI, Laboratoire d'Optique Appliquée (LOA), Y. WANG, Colorado State University, E. OLIVA, Laboratoire d'Optique Appliquée (LOA), L. YIN, B. LUTHER, Colorado State University, G. MAYNARD, D. ROS, Université Paris-Sud, J.J. ROCCA, Colorado State University, PH. ZEITOUN, Laboratoire d'Optique Appliquée (LOA) — The wavefront of a  $\lambda = 18.9$  nm soft x-ray beam from an injection-seeded plasma amplifier created by irradiation of a solid target was measured using a Hartmann wavefront sensor with an accuracy of  $\lambda/32$  in a single shot. A significant improvement in wavefront aberrations from  $0.51 \pm 0.06 \lambda$  rms of high harmonic seed to  $0.23 \pm 0.01 \lambda$  rms for the amplified seeded beam was observed. The variation of wavefront characteristic as a function of time delay between the injection of the seed and peak of soft x-ray amplifier pump was studied. The wavefront sensor allows for the independent measurement of the different aberrations. The strongest improvement of the wavefront as it exits the amplifier is observed for coma, with values improve by more than a factor of 2, from  $0.41 \lambda$  to  $0.18 \lambda$  rms. The measurements were used to reconstruct the soft x-ray source and confirm its high peak brightness of about  $1 \times 10^{26}$  photons/(s.mm<sup>2</sup>.mrad<sup>2</sup>. 0.01% bandwidth).

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