

Abstract Submitted  
for the DAMOP11 Meeting of  
The American Physical Society

**Arbitrarily shaped high-coherence electron bunches from ultra-cold plasma**<sup>1</sup> R.E. SCHOLTEN<sup>2</sup>, A.J. MCCULLOCH, D.V. SHELUDKO, M. JUNKER, S.C. BELL, S.D. SALIBA, K.A. NUGENT, ARC Centre of Excellence in Coherent X-ray Science, School of Physics, The University of Melbourne VIC 3010 Australia — Sources of inherently cold electrons extracted from laser cooled atoms have the potential to transform electron imaging. These sources promise both the spatial coherence and high current required for picosecond molecular scale imaging. Here we demonstrate arbitrary and real-time control of electron bunch shape and thus realise a major step towards alleviation of electron source brightness limitations due to Coulomb explosion. The ability to dynamically shape the electron source itself and to observe that pattern in the propagated electron bunch provides a remarkable experimental demonstration of the intrinsically high spatial coherence of a cold electron source.

<sup>1</sup>Authors McCulloch and Sheludko contributed equally to this work.

<sup>2</sup>scholten@unimelb.edu.au

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Date submitted: 10 Jun 2011

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