

6.6 Cold Rydberg gases and plasmas
may also be appropriate

Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Imaging many-body Coulomb interactions and ultrafast photoionization and diffraction with cold atom electron and ion sources
ROBERT SCHOLTEN, RORY SPEIRS, DENE MURPHY, JOSHUA TORRANCE, DANIEL THOMPSON, BENJAMIN SPARKES, ANDREW MCCULLOCH, The University of Melbourne — The CAEIS cold-atom electron/ion source, based on photoionisation of laser cooled atoms, provides a powerful tool for investigating fundamental physical processes. The very low temperature of the ions has allowed us to image intra-beam Coulomb effects with unprecedented detail. With ultrafast laser excitation and streak detection we can probe competing ionization processes, particularly via Rydberg states, including sequential excitation, multiphoton excitation, resonance-enhanced multiphoton excitation and two-color multiphoton excitation. Knowledge from these studies has enabled ultrafast single-shot diffractive electron imaging with atomic resolution using a CAEIS.

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Date submitted: 26 Jan 2017

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