Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

**Quantum radiation reaction in laser–electron-beam collisions** T.G. BLACKBURN, Clarendon Laboratory, University of Oxford, C.P. RIDGERS, Department of Physics, University of York, J.G. KIRK, Max-Planck-Institut fur Kernphysik, A.R. BELL, Clarendon Laboratory, University of Oxford — The ever-increasing intensity produced by high power, short pulse lasers has led to substantial interest into how radiation reaction and QED processes such as pair production will affect the plasma physics studied in future laser facilities. It is likely that the interaction of a laser pulse of intensity $> 10^{23}\mathrm{Wcm}^{-2}$ with another laser pulse[1] or with a solid density target[2] will produce copious high energy gamma rays and critical density electron-position pair plasmas. Recently we have shown[3] how an experiment that could be accomplished in today's high intensity laser facilities, the collision of a GeV electron beam with a laser pulse of intensity $> 10^{21}\mathrm{Wcm}^{-2}$, could provide clear signatures of quantum radiation reaction. These are the increased yield of the highest energy gamma rays and the broadening in energy of the electron beam, caused by the stochastic nature of photon emission.

[1]A.R. Bell and J.G. Kirk, Phys. Rev. Lett. 101, 200403 (2008)
[2]C.P. Ridgers *et al.*, Phys. Rev. Lett. 108, 165006 (2012)
[3]T.G. Blackburn *et al.*, Phys. Rev. Lett 112, 015001 (2014)

Tom Blackburn
Clarendon Laboratory, University of Oxford

Date submitted: 09 Jul 2014 Electronic form version 1.4