Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Development of a compact, versatile electron beam source[1] S.G. WALTON, Plasma Physics Division, Naval Research Laboratory, C.D. COTHRAN, Global Strategies Group (North America), R.F. FERNSLER, W.E. AMATUCCI, R.A. MEGER, Plasma Physics Division, Naval Research Laboratory — The operating characteristics of a high-energy electron beam source are described. Electrons are extracted from a hollow cathode plasma and then accelerated by anode located downstream from the cathode. The anode to cathode surface area ratio is less than the root of the electron to ion mass ratio such that an electron sheath forms at the anode; a bias on this anode then accelerates the electron flux into a beam. A magnetic field assists the beam collimation. Paschen breakdown in the few Torr range at 500V initiates the hollow cathode plasma, and typical continuous operation requires less pressure and applied voltage. Varying the hollow cathode current allows direct control of the beam current, while the bias on the accelerating anode determines the beam energy. Beams at up to 5kV and 80mA have been produced with this device. Critical component designs for stable operation in both CW and pulsed operation are discussed.

[1]This work was supported by the Office of Naval Research.

Scott Walton
NRL

Date submitted: 04 Aug 2009 Electronic form version 1.4