

Abstract Submitted
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Development of a compact, high energy electron beam source

SCOTT WALTON, RICHARD FERNSLER, ROBERT MEGER, Naval Research Laboratory — The US Naval Research Laboratory is developing a compact, high-energy electron beam source for welding and metal forming applications. The delivery of 1-2 kW over a small surface area is typically sufficient to melt thin metal rods. Thus, beam energies and currents in the range of 25 keV and 50 mA, with a spot size of about 3 mm, are required to deliver this level of power. In this work, we discuss the development of the electron beam source, which operates by extracting electrons from a discharge and then accelerating them to the required energy. To date, we have used a hollow cathode discharge to produce the electrons and a high-voltage wire mesh to accelerate them. We discuss the key attributes of operation and also the possibilities in using different sources and configurations to achieve the desired beam characteristics. This work was supported by the Office of Naval Research and NASA.

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