

First investigations of a warm electron beam ion trap for the production of highly charged ions

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(Received 23 October 1998; accepted for publication 15 February 1999)

A compact warm electron beam ion trap (WEBIT) is described and investigated experimentally. The trap design is based on permanent magnets, an electron gun with a cathode emissivity of 25 A/cm^2 and a gun perveance of $0.1 \mu\text{A/V}^{3/2}$ as well as a vacuum vessel allowing trap operation at pressures of 10^{-10} Torr. The electron beam diameter measured with a pinhole camera was $160 \mu\text{m}$ corresponding to an electron beam density of 248 A cm^{-2} . X-ray spectra measured with a Si(Li) semiconductor detector indicate the production of Xe^{44+} and Ir^{59+} . © 1999 American Institute of Physics. [S0034-6748(99)01006-0]