



A novel room temperature electron beam ion trap for atomic physics and materials research [☆]

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Abstract

Highly charged ions are used in basic investigations to study problems in atomic and plasma physics. Further on, the application of highly charged ions in materials research and other fields as nanomechanics and information techniques grew significantly in the last years. In the present paper, we report on results derived with a warm electron beam ion trap (WEBIT) that works without any cryogenic equipment. A special source construction allows to generate dense electron beams at room temperature with a current density of up to 240 A cm⁻² and an acting ionization factor of $(2 \dots 5) \times 10^{21}$ cm⁻². Ions like Ar¹⁷⁺, Xe⁴⁴⁺ and Ir⁶⁵⁺ were detected by X-ray spectroscopy. A charge capacity of about 8×10^7 elementary charges of the trap is estimated. © 2000 Elsevier Science B.V. All rights reserved.

PACS: 07.77.Ka; 29.30.Kv; 29.25.Ni; 32.30.Rj

Keywords: Electron beam ion sources; Highly charged ions; Iridium ions; X-ray spectra
