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Dresden EBIT: Trap properties and ion production studied by X-ray spectroscopy of helium-like argon

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Abstract

The Dresden EBIT – a compact room-temperature electron beam ion trap (EBIT) – is able to produce argon ions in all stages of ionization. From measured argon X-ray spectra we determine electron beam current densities of 176–514 A cm⁻² at measured electron beam diameters of 145 and 102 μm, respectively. Direct excitation processes in Ar¹⁶⁺ are studied in dependence of additional helium and neon admixtures acting here as coolant. It is shown that the addition of different light gases leads to a specific increase of some ten percent of the argon X-ray output from the trap.

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