

X-ray spectroscopy experiments at EBIS facility in Kielce

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In the present work we report on the results of the X-ray spectroscopy experiments performed at EBIS-A facility in Kielce [1]. These experiments concern the studies of the X-ray emission from highly charged ions extracted from the EBIT, in this case $\sim 3 \text{ keV} \times q \text{ Xe}^{q+}$ ions ($q=26-40$), interacting with metallic Be foil. In such process the so-called „hollow atoms” are created [2-3]. The X-ray emitted in deexcitation of hollow atoms carry information on the structure of such exotic objects as excited highly charged ions. Another type of experiments performed at the EBIS facility is the study of atomic processes taking place in the EBIT plasma, in particular, the electron impact ionization/excitation, radiative/nonradiative deexcitation and radiative recombination processes. In both experiments the X-rays were measured with semiconductor drift detector (SDD) having 129 eV energy resolution at Mn $K\alpha$ line. The X-ray spectra obtained were interpreted assuming electric dipole selection rules and available calculations of X-ray energies in highly charged Xe ions [4]. This allowed to understand the studied processes qualitatively, however, more detailed atomic structure MCDF calculations are needed to fully describe the observed X-ray spectra.

References

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