REGULARITIES IN multicharged ION IONIZATION POTENTIAL DEPENDENCE ON NUMBER OF ELECTRONS *N* AND ATOMIC NUMBER *Z [[1]](#footnote-1)\*)*

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The analysis of experimental and calculated ionization potentials (eV) is carried out in the ground state of multicharged ions of medium and heavy elements from argon (Z = 18) to americium (Z = 95), presented in the NIST tables [1]. These data, considered in special coordinates, indicate patterns in the dependence on the atomic number of the element Z and number of electrons in the ion *N*. The discovered patterns allow us to approximate a large number of tabular values by simple polynomials of the form:

The optimal division is into a group of medium elements, from argon to xenon (18 ≤ Z ≤ 54) with the number of electrons in the range N ≤ Z 5 [2], and a group of heavy elements, from caesium to americium (55 ≤ Z ≤ 95) with the number of electrons 1 ≤ N ≤ 46 [3]. In this case, the degree of approximating polynomials does not exceed three, and small tables of polynomial coefficients make it possible to estimate the ionization potentials with an accuracy of about 1 percent or higher for a total of about three thousand ions from the considered regions. The figures show the characteristic dependences of the ionization potentials of a group of medium elements from K and L shells (Fig.1) and heavy elements from the M shell (Fig.2).

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| Fig.1 | Fig.2 |

References

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3. Shpatakovskaya G.V. JETP Letters, 2021, **114**, 737-741

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Lt/ru/EC-Shpatakovskaya.docx) [↑](#footnote-ref-1)