

RELATIVITY IN THE ELECTRONIC STRUCTURE OF THE HEAVIEST ELEMENTS AND ITS INFLUENCE ON PERIODICITIES IN PROPERTIES

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Spectacular developments in the relativistic quantum theory and calculational algorithms in the last a couple of decades allowed for accurate calculations of properties of superheavy elements (SHEs) and their compounds. Performed at the highest level of modern relativistic quantum theory and, with many of them, in a close link to experimental research, those investigations have proven that relativistic effects determine periodicities in physical and chemical properties of the elements in the chemical groups and rows of the Periodic Table beyond the 6th one. They can, however, also lead to some deviations from the established trends, so that the predictive power of the Periodic Table in the SHE area may be lost. Results of those studies are overviewed in the presentation, with comparison to the recent experimental investigations where available. The future structure of the Periodic Table and prospects for investigations of chemical properties of the elements beyond the 7th row are discussed.