On the Bohr – Weisskopf Effect in the Specific Difference of the $^{209}$Bi Ions

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Theory of anomalous internal conversion is developed, and extended for the description of the Bohr – Weisskopf effect in the hyperfine splitting [1]. Corridor is estimated for expected scatter of the specific difference values depending on the nuclear model. Experimental data on the hyperfine splitting in the H- and Li-like heavy ions of $^{209}$Bi are analyzed. Agreement with the theory is achieved, shedding light on the structure of the magnetization distribution over the nuclear volume.

On the other hand, the method of specific differences [2] in the description of hyperfine structure is subject to a model independence testing. It is shown that the observed [3] “discrepancy” with the specific difference theoretical calculation is due to exceeded precision of the theoretical result. Uncertainty due to the Bohr—Weisskopf effect exceeds error bars indicated previously, both experimental and theoretical ones. As a result, the calculations explain that there is no “discrepancy” with theory, proclaimed on the basis of the past experimental data. There is no reason, to question data concerning nuclear radius or magnetic moment, contrary to the conclusion [2].

References

