Abstract Submitted
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U I hyperfine constant calculations and measurements[1] IGOR SAVUKOV, WEI WEI, ALONSO CASTRO, Los Alamos National Laboratory — Theory of the uranium atom is quite challenging due to a large number of valence electrons, strong mixing between states, strong valence-core interaction and relativistic effects. While energies can be brought in agreement with adjustable parameters, this does not guarantee the correctness of the wavefunctions. Transition probabilities can be used to test the wavefunctions, but their experimental values have significant uncertainty, which arises from uncertainty of density measurements or LTE approximation. Many measurements have substantial disagreement. Hyperfine constants, on the other hand, can be measured with good precision. The configuration-interaction many-body perturbation theory (CI-MBPT) method[1] was applied to calculations of hyperfine constants and a good agreement was found with experiment. We also conducted measurements of hyperfine A and B values for the J=5 even state (energy 11613.975 cm^{-1}) using atomic beam method[2], and found that the measurements are in good agreement with our theory. The results of theoretical calculations and new measurements will be reported. 1. IM Savukov, PM Anisimov, Physical Review A 99 (3), 032507 (2019). 2. V. Lebedev, J.H. Bartlett, and A. Castro, J. Anal. At. Spectrom. 33, 1862-1866 (2018).

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