

Abstract Submitted
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Polarizabilities of Lanthanides and Actinides ALEXANDER KOZLOV, VLADIMIR DZUBA, VICTOR FLAMBAUM, University of NSW — Polarizability of single atoms has been a subject of investigation for a long period of time. It determines interaction of atom with light which is used in optical lattice trapping and optical lattice based atomic clocks, van der Waals forces between atoms and atom-walls interaction. Experimental measurements and theoretical calculations of polarizability for few-electron elements reach as high as one percent discrepancy. Although for more complicated many valence electron systems there's almost no experimental data nor theoretical predictions due to complexity of such calculations. We focus on polarizability calculations for ground and few excited states of lanthanides and actinides. These elements are of the great experimental interest for ultraprecise atomic clocks, searches for variation of fundamental constants and parity non-conservation, application in study of quantum gases. Calculations for atoms with opened f-shell are very complicated and usually have poor accuracy. There is no published data for most of actinides and lanthanides and the accuracy of unpublished results is not determined. We calculate scalar polarizabilities for ground and first few excited states as well as tensor polarizabilities of ground states of opened f-shell elements.

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