

Abstract Submitted
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A new approach to an accurate calculation of hyperpolarizabilities¹ SERGEY PORSEV, MARIANNA SAFRONOVA, University of Delaware, ULYANA SAFRONOVA, University of Nevada in Reno, MIKHAIL KOZLOV, Petersburg Nuclear Physics Institute — A systematic effect that yet to be addressed to further reduce uncertainty of optical atomic clocks is a lattice Stark shift caused by the term nonlinear in lattice intensity and determined by the hyperpolarizability. Due to complexity of the theoretical expression for this quantity no reliable calculations of hyperpolarizabilities are available even for simpler atoms and ions than used for clock applications. We have developed a new approach to calculate hyperpolarizabilities for atoms and ions based on a solution of the inhomogeneous equation, what allows us very effectively and accurately carry out summations over intermediate states. We applied our new method to the calculation of the hyperpolarizabilities for the 1S_0 and 3P_0 clock states in Sr and Yb. The results will be reported at the conference.

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