

Abstract Submitted  
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**Properties of  $\text{Lu}^{2+}$  ion for the atomic clock development** M. S. SAFRONOVA, University of Delaware and JQI, NIST and the University of Maryland, W. R. JOHNSON, University of Notre Dame, U. I. SAFRONOVA, University of Nevada, Reno — Significant bottleneck for further improvement of trapped ion clock accuracy arises from relatively low stability achievable with a single ion. A solution was proposed [1] that may allow to overcome this hurdle via the use of large ion crystals with a special scheme to cancel the effects of micromotion. The crucial condition for the implementation of such a scheme is the negative value of the scalar polarizability difference for the clock transition. Doubly ionized lutetium satisfies such a condition, and a potentially promising candidate for multi-ion clock development [2]. In this work, we study relevant parameters of  $\text{Lu}^{2+}$ , including transition matrix elements, lifetimes, polarizabilities, hyperfine constants and the blackbody radiation shift of the potential clock transition [3].

[1] K. J. Arnold *et al.*, Phys. Rev. A 92, 032108 (2015).

[2] K. J. Arnold and M. D. Barrett (2016), arXiv:1607.04344.

[3] U. I. Safronova, M. S. Safronova, W. R. Johnson, Phys. Rev. A 94, 032506 (2016).

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