Abstract Submitted
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Ytterbium in quantum gases and atomic clocks: van der Waals interactions and blackbody shifts[1] SERGEY PORSEV, MARIANNA SAFRONOVA, University of Delaware, CHARLES CLARK, NIST and the University of Maryland — We evaluated the C_6 coefficients of Yb-Yb, Yb-alkali, and Yb-group II van der Waals interactions with 2% uncertainty. The only existing experimental result for such quantities is for the Yb-Yb dimer. Our value, $C_6 = 1929(39)$ a.u., is in excellent agreement with the recent experimental determination of 1932(35) a.u. We have also developed a new approach for the calculation of the dynamic correction to the blackbody radiation shift. We have calculated this quantity for the Yb $6s^2\ {}^1\mathrm{S}_0 - 6s6p\ {}^3\mathrm{P}^o_0$ clock transition with 3.5% uncertainty. This reduces the fractional uncertainty due to the blackbody radiation shift in the Yb optical clock at 300 K to the 10^{-18} level.

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