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Ytterbium in quantum gases and atomic clocks: van der Waals interactions and blackbody shifts S. G. PORSEV, M. S. SAFRONOVA, University of Delaware, CHARLES W. CLARK, Joint Quantum Institute — We evaluated the C_6 coefficients of Yb-Yb and Yb-alkali/group II van der Waals interactions with 2% uncertainty. The only existing results for such quantities are 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. [M. Kitagawa, *et al., Phys. Rev. A* **77**, 012719 (2008)]. 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 $6s^2\ {}^1\mathrm{S}_0 - 6s6p\ {}^3\mathrm{P}_0^\circ$ 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. For further details, see http://arxiv.org/abs/1208.1456

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