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Theoretical study of the Cf^{15+} and Cf^{17+} ions to develop an optical clock[1] SERGEY PORSEV, University of Delaware, ULYANA SAFRONOVA, University of Nevada in Reno, MARIANNA SAFRONOVA, University of Delaware — A recent experimental progress in cooling and trapping of highly charged ions (HCIs) using sympathetic cooling made HCIs accessible for high resolution spectroscopy and precision fundamental studies. Based on these achievements, we explore a possibility to develop optical clocks using transitions between the ground and a low-lying excited state in the Cf^{15+} and Cf^{17+} ions. Low-lying energy levels for these ions were calculated earlier in [1,2] and it was shown that certain transitions are extremely sensitive to hypothetical variation of the fine-structure constant. Using a high-accuracy relativistic method of calculation we systematically studied properties of these ions and analyzed a number of systematic effects (such as the electric quadrupole-, micromotion-, and Zeeman quadratic shifts of the clock transitions) that affect the accuracy and stability of the optical clock. We also calculated magnetic dipole hyperfine-structure constants of the clock states and the blackbody radiation shifts of the clock transitions. The results will be reported at the conference. [1] V.A. Dzuba, M.S. Safronova, U.I. Safronova, and V.V. Flambaum, Phys. Rev. A **92**, 060502(R) (2015); [2] J.C. Berengut, V.A. Dzuba, V.V. Flambaum, and A. Ong, Phys. Rev. Lett. **109**, 070.

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