Abstract Submitted
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Experimental progress of dual-wavelength good-bad cavity active optical clock.[1] TIANTIAN SHI, DUO PAN, XIAOGANG ZHANG, JINGBIAO CHEN, State Key Laboratory of Advanced Optical Communication, System and Network, School of Electronics Engineering and Computer Science, Peking University, OPTICAL CLOCK TEAM — Active optical clock, first proposed in 2005, utilizing optical stimulated emission on ultranarrow clock transitions in bad cavity regime, is expected to realize mHz linewidth due to the influence of thermal vibrations of cavity mirrors on the emitted optical frequency can be greatly reduced, which is still a hurdle for current optical clocks. To obtain the theoretical quantum limitied linewidth, we proposed the dual-wavelength good-bad cavity active optical clock, of which Nd:YAG 1064 nm and Cs 1470 nm lasers share the same cavity and operate in good and bad cavity regime, respectively. The 1064 nm laser frequency is locked to a super cavity at subhertz with PDH technique to stabilize the cavity length, and the frequency stability of the 1470 nm ultimate laser is expected to be improved by 2 orders of magnitude than that of the PDH stabilized laser due to the cavity pulling suppression effect in bad cavity regime. Experimentally, we build two independent systems and demonstrate typical characteristics of the dual-wavelength signals. To further suppress the residual cavity pulling effect, we lock the two good cavity signals to each other to stabilize the cavity length and measure the frequency stability of ultimate laser by heterodying between the two systems.

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