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Experimental research of good-bad cavity dual-wavelength active optical clock[1] JINGBIAO CHEN, DUO PAN, BIAO XUE, TIANTIAN SHI, Peking University — The stability of clock laser for optical clocks is currently limited by the cavity-length noise of the super cavity, which is induced by the thermal Brownian-motion. The active optical clock, first proposed in 2005, has dramatically reduced the sensibility of the output frequency to the cavity-length noise, nevertheless, the stability is still limited by the residual cavity pulling effect. To stabilize the main cavity length, we propose a dual- wavelength active optical clock, of which the two output lasers with different wavelength share the same cavity, and work in good cavity regime at YAG 1064 nm and bad cavity regime at Cs 1470 nm, respectively. The good cavity signal is locked to a super cavity by the PDH technique, and thus the main cavity length of the active optical clock is stabilized. The frequency stability of the active optical clock signal is expected to be improved by 2 orders of magnitude than that of the PDH stabilized signal, due to the suppression of cavity pulling effect in the bad cavity. Experimentally, we realize the dual-wavelength output of the active optical clock, and the power and linewidth characteristics are preliminarily studied. In the next step, we will work on the PDH stabilization of the bad cavity signal.

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