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STUDY ON A HIGH PERFORMANCE RUBIDIUM ATOMIC FREQUENCY STANDARDS

Abstract

As everyone knows, physics package is the core of the rubidium atomic frequency standards(RAFS). In this papers, the structure and heat interface of physics package are modified and redesigned, and a high performance RAFS will be reported. The physics package is designed according to the three cells scheme, in which a magnetron microwave cavity and optical filter are used. After experiment verification, some conclusions can be made. Optical filter could reduce the system noise of RAFS. Magnetron microwave cavity with TE011 field could intensify the resonance signal. The light-shift and temperature coefficient(TC) could be conveniently adjusted in the three cells scheme. A preliminary test shows that a frequency stability of modified RAFS is less than $1\text{E-}12$ for 1s and $1\text{E-}14$ for 10000s.