

Intermittent operation of a lattice clock toward the realization of a time scale

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With a reference to a ^{87}Sr lattice clock, we demonstrated a frequency evaluation of a hydrogen maser (HM) over a few months. The HM is a part of the Japan Standard Time (JST) system and is linked to the International Atomic Time (TAI). Therefore, the result obtained over a few months has enabled an accurate TAI-based frequency measurement with the smallest uncertainty [1]. This measurement may be utilized to calibrate the clock rate of the TAI since lots of frequency measurements reported by many laboratories have now determined the absolute frequency of the ^{87}Sr clock transition with an uncertainty of 5×10^{-16} . The results were also utilized for a feasibility study of steering HM frequency to generate a time scale. Referring the time differences recorded in the JST system, it was figured out that the intermittent operation of the lattice clock once in two weeks allows us to maintain the time scale in a few ns level.

[1] H. Hachisu and T. Ido, Jpn. J. Appl. Phys. 54, 112401 (2015).

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