

Report to the CCL/CCTF joint working group from LNE-SYRTE, France.

The CIPM on its meeting in autumn 2004 has decided that the unperturbed ground-state hyperfine quantum transition of ^{87}Rb .

May be used as a secondary representation of the second with a frequency of

$f_{\text{Rb}} = 6\,834\,682\,610.904\,324\text{ Hz}$

and an estimated relative standard uncertainty (1σ) of 3×10^{-15} .

1. Frequency sources in the microwave domain.

Question 1.1 Yes.

We have made a new measurement of the frequency of the Rb hyperfine transition.

The result is: $6\,834\,682\,610.904\,322\,6\text{ Hz}$ with an estimated uncertainty (1σ) of 1.6×10^{-15}

Question 1.2: No

Question 1.3: No

2. Frequency sources in the optical domain.

Question 2.1 No

Question 2.2 Yes

We have developed 2 experiments: the first one is using ^{87}Sr atoms stored in an optical lattice at the magic wavelength. We have up to now observed a resonance with a width of 1kHz. We expect a frequency measurement at the 10^{-14} level in 2006.

The second one started end 2004 and uses ^{199}Hg atoms also stored in optical lattices at a magic wavelength of 340nm. The optical clock transition will be also a $^1\text{S}_0 \rightarrow ^3\text{P}_0$ transition, the cooling will be directly performed on the $^1\text{S}_0 \rightarrow ^3\text{P}_1$ transition.

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