

## MEP 2005

### STRONTIUM ( $\lambda \approx 698$ nm)

#### Atom $^{87}\text{Sr}$ , $^1\text{S}_0 - ^3\text{P}_0$ transition

##### 1. CIPM recommended values

The values  $f = 429\,228\,004\,229\,910$  Hz  
 $\lambda = 698\,445\,709.612\,694$  fm  
with a relative standard uncertainty of  $2 \times 10^{-13}$ , apply to the radiation of a laser stabilized to Sr atoms.

##### 2. Source data

Adopted value	$f = 429\,228\,004\,229\,910$ (85) Hz	$u_c/y = 2 \times 10^{-13}$
	for which:	
	$\lambda = 698\,445\,709.612\,694$ (140) fm	$u_c/y = 2 \times 10^{-13}$

calculated from

$f/\text{Hz}$	$u_c/y$	source data
429 228 004 229 952	$2.2 \times 10^{-13}$	[1, 2]
429 228 004 229 867	$1.1 \times 10^{-13}$	[3]
Unweighted mean:	$f = 429\,228\,004\,229\,910$ Hz	

The difference of 85 Hz between the two values was considered to be significant, given the stated uncertainties from both institutes. As a result, the value recommended by the CCL is the unweighted mean of these two values, with an adopted uncertainty equal to the discrepancy of 85 Hz, corresponding to a relative standard uncertainty of  $2 \times 10^{-13}$ .

##### 3. References

- [1] Takamoto M., Hong F.-L., Higashi R., Katori H., An optical lattice clock, *Nature*, **435**, pp.321-24, 2005.
- [2] Hong F.-L., Takamoto M., Higashi R., Fukuyama Y., Jiang J., Katori H., Frequency measurement of a Sr lattice clock using an SI-second-referenced optical frequency comb linked by a global positioning system (GPS), *Optics Express*, **13**, pp. 5253-62, 2005.
- [3] Ludlow A. D., Boyd M. M., Zelevinsky T., Foreman S. M., Blatt S., Notcutt M., Ido T. Ye J., Systematic Study of the  $^{87}\text{Sr}$  Clock Transition in an Optical Lattice, *ArXiv:physics*, 0508041v1-4, 2005.