

MEP 2005

YTTERBIUM ($\lambda \approx 436$ nm)

Absorbing ion $^{171}\text{Yb}^+$, $6s\ ^2\text{S}_{1/2}$ ($F = 0, m_F = 0$) – $5d\ ^2\text{D}_{3/2}$ ($F = 2, m_F = 0$) transition

1. CIPM recommended values

The values $f = 688\ 358\ 979\ 309\ 308$ Hz
 $\lambda = 435\ 517\ 610.739\ 688$ fm

with a relative standard uncertainty of 9×10^{-15} , apply to the unperturbed quadrupole transition of a trapped and cooled ytterbium ion.

2. Source data

Adopted value $f = 688\ 358\ 979\ 309\ 308$ (6) Hz $u_c/y = 9 \times 10^{-15}$

for which:

$\lambda = 435\ 517\ 610.739\ 688$ (4) fm $u_c/y = 9 \times 10^{-15}$

calculated from

f / Hz	u_c/y	source data
688 358 979 309 307.65	3.1×10^{-15}	[1]

Given that only one laboratory contributed to the measurement of this transition, the CCL decided it was prudent to round the PTB value to the nearest Hz to obtain the CCL value, and increase the stated relative uncertainty by a factor of three, and then rounded, to give 6 Hz total uncertainty.

3. References

- [1] Riehle F., Report to the CCL and to the CCL/CCTF Joint Working Group on Recent Frequency Measurements of the $435\text{nm}\ ^2\text{S}_{1/2}(F=0) - ^2\text{D}_{3/2}(F=2)$ transition of $^{171}\text{Yb}^+$ (and references therein).