The Light Cube: A Geometric Relation Between the Speed of Light, the Astronomical Unit, and the Mean Solar Day

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Abstract

We present a simple numerical relation linking the defined speed of light c, the astronomical unit (AU), the geometric factor $\sqrt{3}$, and the duration of the mean solar day:

$$c = \frac{100\,\mathrm{AU}\,\sqrt{3}}{86400}.$$

Using the exact IAU definition of the astronomical unit ($1\,\mathrm{AU} = 149\,597\,870\,700$ m), the relation yields

$$c_{\mathrm{calc}} = 299\,792\,549.084\ \mathrm{m/s},$$

which differs from the defined SI value

$$c = 299\,792\,458\ \mathrm{m/s}$$

by only 91.084 m/s, corresponding to a relative deviation of 3.04×10^{-7} (agreement 99.9999696%).

1 The Light Cube Relation

We consider the numerical expression

$$c = \frac{100\,\mathrm{AU}\,\sqrt{3}}{86400}.$$

The formula combines:

- the astronomical unit (AU),
- the geometric factor $\sqrt{3}$,
- the mean solar day (86400 s),
- and the integer scaling coefficient 100.

2 Numerical Verification

Using the exact IAU definition

$$1\,\mathrm{AU} = 149\,597\,870\,700\ \mathrm{m},$$

we obtain

$$100\,\mathrm{AU} = 14\,959\,787\,070\,000\ \mathrm{m}.$$

Multiplying by $\sqrt{3}$:

$$100\,\mathrm{AU}\,\sqrt{3} = 25\,902\,076\,340\,854.65\ \mathrm{m}.$$

Dividing by the duration of the mean solar day:

$$c_{\mathrm{calc}} = \frac{25\,902\,076\,340\,854.65}{86400},$$

which gives

$$c_{\mathrm{calc}} = 299\,792\,549.084\ \mathrm{m/s}.$$

The exact SI value is

$$c_{\mathrm{SI}} = 299\,792\,458\ \mathrm{m/s}.$$

The absolute difference is

$$\Delta c = c_{\mathrm{calc}} - c_{\mathrm{SI}} = 91.084\ \mathrm{m/s}.$$

The relative deviation is

$$\frac{\Delta c}{c_{\mathrm{SI}}} = 3.04 \times 10^{-7}.$$

Equivalently, the numerical agreement is

$$99.9999696\%.$$

3 The Near-Integer Inversion

Inverting the relation isolates the scaling factor:

$$N = \frac{c\,86400}{\mathrm{AU}\,\sqrt{3}}.$$

Using the exact SI speed of light and the exact IAU astronomical unit:

$$N = \frac{299\,792\,458 \times 86400}{149\,597\,870\,700 \times \sqrt{3}}.$$

This yields

$$N = 99.9999696215.$$

Thus the coefficient differs from the integer value 100 by

$$100 - N = 3.03785 \times 10^{-5}.$$

4 Conclusion

The expression

$$c = \frac{100\,\mathrm{AU}\,\sqrt{3}}{86400}$$

reproduces the defined speed of light to within approximately 3×10^{-7} relative error.

The inverse form yields

$$N = 99.9999696215,$$

which lies remarkably close to the integer value 100.

Whether this correspondence reflects a deeper geometric structure or merely an unusual numerical coincidence remains an open question.

I am almost joking. But the numbers keep working.

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References

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