

Uncertainty

Physics

How to state a measurement honestly, and how uncertainty propagates.

Uncertainties combine differently for sums and for products.

Add/subtract: add absolute · Multiply/divide: add percentage

$$(5.0 \pm 0.1) + (3.0 \pm 0.2)$$

Absolute added.

$$8.0 \pm 0.3$$

$$(5.0 \pm 2\%) \times (3.0 \pm 3\%)$$

Percentages added.

$$15.0 \pm 5\%$$

Raised to a power n

Multiply percentage by n

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✗ **Adding percentage uncertainties when adding quantities**

✓ **Add absolute uncertainties for sums**

The rules differ by operation. Mixing them can be badly wrong when the two values differ greatly in size.

Quote uncertainty to one significant figure, and match the value's decimal places to it.