

----- Forwarded message from hill@math.gatech.edu -----

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From: hill@math.gatech.edu

Subject: Which is it?

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Dear Ian,

On May 27 you wrote in an email, "I believe the new young generation are more savvy than [Ted] gives them credit for. Of course they are not right up there with quantum mechanics, but it is not completely unfamiliar to them...this is the new generation, and they are a long way ahead of where we were at that age."

Three days later you wrote, "Your preference for redefining the kilogram in terms of the mass of an atom is based on a preference for a definition that is easy to comprehend. But many would say that we have lost that battle already. The experiments to realise the definition of the second and the metre are already too complicated for many students to understand, and that applies also the other base units."

Which is it? Is the next generation of scholars from many fields savvy enough to understand the proposed New SI, or are the definitions and realizations too complicated for many to understand?

The answer is clear from the exact wording in your forthcoming paper in Philos Trans Royal Society:

(1). "The effect of this definition is that the second is the duration of 9 192 631 770 periods of the radiation corresponding to the

transition between the two hyperfine levels of the ground state of the caesium 133 atom."

(2). "The effect of this definition is that the metre is the length of the path travelled by light in vacuum during a time interval of $1/299\,792\,458$ of a second."

(3). "The effect of this definition, together with those for the second and the metre, is to express the unit of mass in terms of the unit of frequency through the fundamental equations $E = mc^2$ and $E = hv$ used to relate the frequency ν equivalent to a mass m ."

The first two explanations are clean and clear, resting solely on intuitive notions such as concrete integers, cesium atoms and the speed of light in a vacuum. The third is a vague and incomplete kilogram recipe.

Thus, the answer to the question <Which is it?> is simply this. If the New SI is adopted, almost everyone who tries will have a good grasp of what a second and meter are, but almost no one will have a good grasp of what a kilogram is.

Statements (1) and (2) are fine working textbook definitions of the second and meter. For more than four years we have been asking you for a similar textbook definition of the proposed New SI kilogram, analogous to (1) and (2). Perhaps one of the independent proponents of your New SI can provide one.

Kind regards

Ted

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