

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

Date: Wed, 31 Oct 2012 18:44:14 -0400

From: hill@math.gatech.edu

Subject: NIST Lecturer "Explaining the kilogram"

To: edwin.williams@nist.gov

Cc: Peter Mohr <peter.mohr@nist.gov>, "Barry N. Taylor" <barry.taylor@nist.gov>, Patrick Gallagher <patrick.gallagher@nist.gov>, RER <rer@panet.de>, Brian Leonard <bpleona@uakron.edu>, Ingvar Johansson <ingvar.johansson@philos.umu.se>, Brynn Hibbert <b.hibbert@unsw.edu.au>, Gary Price <grprice2@gmail.com>, René Dybkær <rene.dybkaer@frh.regionh.dk>, Paul De Bièvre <paul.de.bievre@skynet.be>, "carles.furio@uv.es" <carles.furio@uv.es>, Franco Pavese <frpavese@gmail.com>, Albert C Censullo <alfornow@sbcglobal.net>, Ian Mills <ian704mills@btinternet.com>, Jack Miller <j_miller@lbl.gov>, "khru@imp.kiae.ru" <khru@imp.kiae.ru>, "Marcus.Foster@csiro.au Foster" <marcus.foster@csiro.au>, "Romeu C. Rocha F" <romeu@ufscar.br>, Stephen Humphry <stephen.humphry@uwa.edu.au>, "weirr@rmc.ca" <weirr@rmc.ca>, Ulrich Feller <ulrich.feller@bluewin.ch>, Walter Emerson <walteremerson@btinternet.com>, Walter Bich <w.bich@inrim.it>, "wbrand@bgc-jena.mpg.de" <wbrand@bgc-jena.mpg.de>, John Saunders <johnrichardsaunders@gmail.com>, "g.p.moss@qmul.ac.uk" <g.p.moss@qmul.ac.uk>, "aprauter@fc.ul.pt" <aprauter@fc.ul.pt>, "herold@ist.utl.pt" <herold@ist.utl.pt>, "juris.meija@nrc.ca" <juris.meija@nrc.ca>, "fcamoes@fc.ul.pt" <fcamoes@fc.ul.pt>, "a.fajgelj@iaea.org Fajgelj" <A.Fajgelj@iaea.org>, p.g.nelson@hull.ac.uk, alessandro.giordani@unicatt.it, Imari@liuc.it

Dear Edwin,

In the second slide of your attached lecture "Proposed changes to the SI, their impact on fundamental constants and other SI units", you state

"What is needed to implement the new system" is to "Educate your community".

Later in your lecture you have a slide entitled "Explaining the kilogram". Is that your answer to question Q3) in the email below?

Here is precisely what your slide reads:

EXPLAINING THE KILOGRAM

The kilogram is the mass of 6.0221415×10^{26} idealized atoms, each of these atoms having a mass such that the Planck constant, the most important constant in quantum mechanics, has the specified value of $6.6260693 \times 10^{-34}$ joule second.

Such atoms have a mass very close (within an uncertainty of 1.4 ng/g) to 1/12th the mass of ^{12}C . This means that a mole of ^{12}C weighs $12 \times (1 \pm 1.4 \times 10^{-9})$ g.

Can you please tell us exactly what an "idealized atom" is?

In particular:

How many (idealized?) neutrons and protons does an "idealized atom" have?

How is an "idealized atom" different from a standard C-12 atom?

How are institutions going to "educate their communities", as you put it, if you and your colleagues do not respond to basic questions about the definitions you proposed?

Please answer the two above questions about your "Explaining the kilogram" slide, and the three basic questions in the email below.

Thank you for your time.

Sincerely

Ted Hill

Dr. Theodore P. Hill

<http://people.math.gatech.edu/~hill/>

Quoting hill@math.gatech.edu:

> Dear Peter, Barry, and Edwin,
>
> NIST has spent considerable public funds (salaries, travel, admin,
> computer support etc) for development and promotion of your Proposed
> New SI.
>
> As you know, serious criticisms and alleged flaws of your proposal
> continue to arise in the online debates in the international
> scientific community. The flaws and shortcomings are also being
> published in professional journals such as Metrologia, The Chronicle
> of Higher Education, Chemistry International, The Scientist and an
> entire issue of Accreditation and Quality Assurance. Three of these
> are attached for your convenience:
>
> [1] Metrologia article
> [2] Chronicle of Higher Education article
> [3] Accreditation and Quality Assurance article.
>
> (Your coauthor Ian Mills asked me twice to send him copies of [1],
> which I did twice, with copies to all of you, but I never received a
> reply, so perhaps your team has not seen it.)
>
> Many of the criticisms focus on your proposed redefinitions of the
> mole and of the kilogram, which is central to your proposal. In
> particular, you have not answered Point 1 of [3] about the mole, nor
> the following three basic questions about your redefinition of the
> kilogram (the Planck kilogram):
>
> Q1). Isn't the order of magnitude of the exact numerical constant
> implicit in your Planck kilogram (more than 10^{40}) not only
> physically unrealistic but also completely out of line with the
> magnitude of the constants in other SI definitions?
>
> (Please see Professor Johansson's recent email below, and Point 5 of [3].)
>

> Q2). How do you take into account new evidence that the
> fine-structure constant alpha varies in time and location, since
> that would imply that your equations for defining the Planck
> kilogram would also vary?
>
> (Please see Professor Hibbert's recent email below, and Point 8 of [3].)
>
> Q3). What is your proposed introductory textbook definition
> (including necessary pre-definitions) of your Planck kilogram?
>
> Both the U.S. President and Congress have repeatedly emphasized the
> extreme importance of science education. On the surface, NIST
> appears to agree, since in your 2006 Metrologia article you
> proclaimed
>
> "since it is important that the basis of our measurement system be
> taught in schools and universities, it is preferable... that the
> definitions of base units be comprehensible to students in all
> disciplines."
>
> Unfortunately, however, when we raised Q3) to you over 5 years ago,
> the NIST response (copied to all of you, disclaimed by none), was
>
> "I am not in the business of writing introductory textbooks I will
> leave that to others."
>
> Since then, articles in professional journals (e.g. [1], [2], [3])
> have repeatedly pointed out that your Planck kilogram requires
> knowledge of the theories of both quantum physics and general
> relativity, and hence is not, as you put it, "comprehensible to
> students in all disciplines". It is not even easy for university
> physics majors.
>
> We citizen scientists and our fellow taxpayers have paid for the
> NIST "New SI" research, and we deserve prompt and detailed
> responses to these and related concerns about your proposed New SI.
> For starters, please answer the main criticisms about the mole
> outlined in Point 1 of [3], and the kilogram questions Q1)-Q3)
> above, both in email and on the record (e.g. in publications).
>
> By "response" we mean professional responses, not personal attacks
> like the NIST email of 19 Jun 2011 (again, copied to all of you,
> disclaimed by none):
>
> "no matter what the subject, there are always a few but very vocal
> individuals who disagree with and therefore oppose and try to undo
> the consensus view. For example, there are the members of the Flat
> Earth Society as well as those who believe global warming is a
> hoax, that the Holocaust never happened, that the landing of men on
> the moon was faked by the United States government, that man as we
> know him is the result of "intelligent design" and not Darwinian
> evolution, that UFOs are real..."
>
> Certainly NIST can do better than that.
>
> Thank you for your time.
>
> Ted Hill
>
> -----
> Date: Tue, 18 Sep 2012 12:49:17 +0200
> From: Ingvar Johansson <ingvar.johansson@philos.umu.se>
> Subject: an oddity of the new kg
>
> ...Now, since the numerical values of h and c are stipulated, one

> can by means of the equation $m = (hv)/c^2$ calculate the frequency ν
> when $m = 1$ kg. The rounded result is: $\nu = 1.4 \times 10^{50}$ hertz. This
> is an extremely high frequency...[so] the kilogram definition
> cannot be directly related to any kind of particle in the whole
> universe...
>
> -----
> On Fri, Aug 31, 2012 at 9:41 AM, Brynn Hibbert
> <b.hibbert@unsw.edu.au><mailto:b.hibbert@unsw.edu.au>> wrote:
>
> ...You might be interested in learning of a recipient of an
> Australian science prize (Eureka award), Dr John Webb who won a
> prize this week for his work showing that the fine structure
> constant (α) varies across the universe...
> ----