

September 12, 2014

Professor B. Thomas Soifer
California Institute of Technology
111 E. Bridge • 103-33
Pasadena, CA 91125

Dear Professor Soifer,

Recent public statements by a member of your faculty (Sean Carroll) have accentuated the unresolved status of a question in gravitational physics that was insufficiently handled by another Caltech faculty member (Kip Thorne) 30 years ago. (See enclosures.) I am writing now in hopes that you would help to bring this matter to its final and proper resolution.

My assessment of “insufficient handling” is based on what I understand as the ideal of science whereby scientists (according to the Royal Society) are supposed to “withstand dominance of authority and...verify all statements by an appeal to facts determined by experiment.”

The matter at hand concerns an experiment that Galileo proposed in 1632. With modern technology the test is well within the realm of feasibility and modest monetary cost. Yet it remains undone. As indicated in Thorne’s 1984 response, the result of the experiment is nevertheless presumed to be known on the basis of the authority of Newton and Einstein.

In a critique of the work of two social scientists, Sean Carroll has rightly pointed out that “...thinking deeply [about a scientific problem] doesn’t cut it [because] people are not especially logical creatures.” (See enclosure.) Carroll goes on to stress the importance of living up to the empirical ideals of science. Concerning Galileo’s experiment, however, Carroll has failed to acknowledge that, for the purpose of establishing a scientific fact, a theoretical prediction is no more admissible than “deep thinking”; and that physicists can be just as fallible and illogical as social scientists. My gentle attempts to point this out in my responses to Carroll’s blog post and other correspondence have been ignored.

The enclosed paper (which has been sent to both Thorne and Carroll) presents three arguments—including the empirical ideals of science—on whose basis Galileo’s experiment should no longer be ignored. I hope you see that the present state of affairs is scientifically unsatisfactory. The only authority whose testimony really counts, i.e., Nature, has not yet been called in on the case.

Please respond accordingly. Thank you very much.

Sincerely,



Richard Benish
4243 E. Amazon Dr. • Eugene, OR 97405
rjbenish@comcast.net
enclosures

PS,

I’ve also enclosed documents establishing that Thorne’s (deceased) co-author, John A. Wheeler, went through the motions of resolving the matter by alluding to non-existent evidence. I’m sorry for bringing such an embarrassing exchange to your attention. But there it is. In the interest of science, is it more important to save face or to discover the truth and let it be known? It’s up to you.

RB

CALIFORNIA INSTITUTE OF TECHNOLOGY

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THEORETICAL ASTROPHYSICS 130-33

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3 December 1984

Mr. Richard Benish
3038 Market Street
Oakland, CA 94608

Dear Mr. Benish:

This replies to your letters of November 23 to me and to President Goldberger.

There is an alternative way to understand the Misner-Thorne-Wheeler claim that the test particle will oscillate through the center of the Earth: For an object such as the Earth with weak self-gravity, general relativity is mathematically equivalent to Newton's theory of gravity; the two must give the same predictions for any experiment to within a precision of $GM/Rc^2 = 7 \times 10^{-10}$, where, M and R are the mass and radius of the Earth, and G and c are Newton's gravitation constant and the speed of light. The analysis of the motion of the test particle in Newtonian theory is particularly simple and gives the unequivocal answer that it will oscillate in the tunnel through the Earth, as claimed.

Newton's and Einstein's predictions agree. But no EMPIRICAL evidence is given.

Let's see it then.

Sincerely,


Kip S. Thorne

KST:pal
cc: Marvin L. Goldberger

$$S = k \cdot \log W$$

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Testing Your Theories Is Not a Matter of “Envy”

Posted on April 2, 2012 by Sean Carroll

Via [JenLuc Piquant's twitter feed](#), here's one time I'm not going to stick up for my colleagues in the social sciences: [a misguided attempt to cast the search for empirical support as “physics envy.”](#) It's a *New York Times* Op-Ed by Kevin Clarke and David Primo, political scientists at the University of Rochester.

There is something rightly labeled “physics envy,” and it is a temptation justly to be resisted: the preference for reducing everything to simple and clean quantitative models whether or not they provide accurate representations of the phenomena under study. The great thing about physics is that we study systems that are so simple that it's quite useful to invoke highly idealized models, from which fairly accurate quantitative predictions can be extracted. The messy real world of the social sciences doesn't always give us that luxury. The envy becomes pernicious when we attack a social-science problem by picking a few simple assumptions, and then acting like those assumptions are reality just because the model is so pretty.

However, that's *not* what Clarke and Primo are warning against. Their aim is at something altogether different: the idea that theories should be tested empirically! They write,

Many social scientists contend that science has a method, and if you want to be scientific, you should adopt it. The method requires you to devise a theoretical model, deduce a testable hypothesis from the model and then test the hypothesis against the world...

But we believe that this way of thinking is badly mistaken and detrimental to social research. For the sake of everyone who stands to gain from a better knowledge of politics, economics and society, the social sciences need to overcome their inferiority complex, reject hypothetico-deductivism and embrace the fact that they are mature disciplines with no need to emulate other sciences...

Unfortunately, the belief that every theory must have its empirical support (and vice versa) now constrains the kinds of social science projects that are



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Recent Comments

- [kashyap vasavada](#): @forrest noble: “I also believe that much of modern physics is...

undertaken, alters the trajectory of academic careers and drives graduate training. Rather than attempt to imitate the hard sciences, social scientists would be better off doing what they do best: thinking deeply about what prompts human beings to behave the way they do.


Sorry, but “thinking deeply” doesn’t cut it. People are not especially logical creatures, and we’re just not smart enough to gain true knowledge about the world by the power of reason alone. That’s why empiricism was invented in the first place, and why it’s been so spectacularly successful over the last few centuries.

Clarke and Primo seem to confuse “the need for empirical testing” with “the need for every model proposed to be backed up by data before it gets published.” If they had stuck to rejecting the latter narrow idea, they would have had a decent case. Certainly we physicists don’t require that every model be supported by data before it is published — otherwise my CV (and those of most of my friends) would be a lot shorter! But we all agree that the *ultimate* test of an idea is a confrontation with data, even if a theory might be too immature for that confrontation to take place just yet.




- vic: Very good conversation. There is belief in God and belief in the belief in God...
- Mel: As a supplement to the Wittgenstein lectures I posted above, here is Einstein on...
- forrest noble: Should Scientific Progress Affect Religious Beliefs? I think that true...
- kneemo: It's inevitable that scientific progress affect religious beliefs. Gone...
- Harold Gower: Consider the difference between belief and faith. I believe that the sun...

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Benish says:

April 3, 2012 at 1:21 am

The gist of Sean's post is admirable, as it reflects the standard lofty ideals of science. It is probably impossible to be reminded too often that,

"... 'thinking deeply' doesn't cut it. People are not especially logical creatures, and we're just not smart enough to gain true knowledge about the world by the power of reason alone."

It is therefore pertinent to point out a huge domain of gravitational physics where deep thinking holds sway and empirical evidence is absent. The cliché is that General Relativity has been quite thoroughly tested throughout the Solar System and that, to quote Stephen Hawking: "We already know the laws that govern the behavior of matter under all but the most extreme conditions." By extreme is meant extreme velocities and extremely strong gravitational fields.

The domain I have alluded to is one where even Newtonian gravity has not been tested. Given a uniformly dense sphere with a hole through the center, a test object is dropped into the hole. What happens? By "thinking deeply" textbooks and professors answer: simple harmonic motion. But no observational data is ever cited—because we have none.

The media is barraged with science shows and articles about black holes and wormholes. All the while we have no empirical evidence pertaining to an extremely simple (in principle) gravitational experiment involving an ordinary hole. Aside from healthy curiosity and a humble desire to live up to the ideals of science, interested readers may like to consider other reasons why it would be a good idea to fill in the gap in our empirical knowledge of gravity:

<http://astroreview.com/issue/2012/article/the-direction-of-gravity>

Like or Dislike:  



THE UNIVERSITY OF TEXAS AT AUSTIN
AUSTIN, TEXAS 78712

Center for Theoretical Physics
(512) 471-3751

January 22, 1985

Mr. Richard Benish
3038 Market Street
Oakland, CA 94608

Dear Mr. Benish:

Many thanks for your thoughtful seven pages of worries about the proposition stated in the book Gravitation of Misner, Thorne, and Wheeler. According to it, a spaceship dropped into an evacuated shaft through the center of an earth of uniform density will execute oscillations through it with a period of eighty-four minutes, identical with the time required to go around in orbit just above the surface. In contrast, page 2 of your letter argues from weightlessness that the object never reaches the center of mass; that the distance between the particle and the center decreases asymptotically.

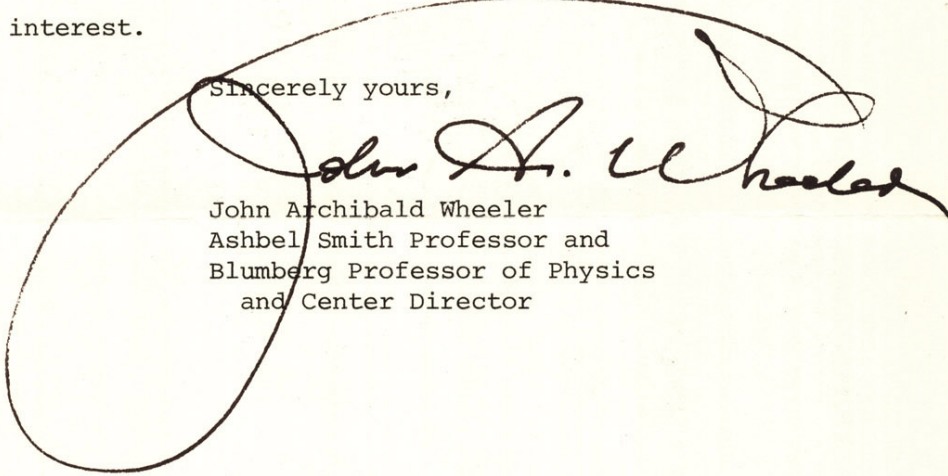
The best place to see a spherical distribution of mass with a hole through it is a star cluster. Spectroscopic observations show that individual stars oscillate right through it in the stated manner.

*Bogus claim
of "evidence."
See remark
from Kyle
Cudworth,
attached.*

I am sending a copy of this reply to my colleague, Roger Bengtson, to whom -- rather than me -- you addressed your original letter.

Many thanks for your interest.

Sincerely yours,


John Archibald Wheeler
Ashbel Smith Professor and
Blumberg Professor of Physics
and Center Director

JAW:ec

cc: R. Bengtson

Date: Mon, 8 Jul 1996 10:45:28 -0500
From: Kyle Cudworth <kmc@hale.yerkes.uchicago.edu>
To: rjbenish@teleport.com
Subject: Re: gravity-induced radial oscillation

I am quite sure that Hubble observations have not directly shown stellar oscillations through the centers of star clusters. Hubble has observed the centers of clusters (and of galaxies) but the observations have been of only one component of the stellar velocities, with the other two components left unmeasured. The interpretations of the data make assumptions about the other components and then make general statements that may sound as if everything is known, but that's very different from the kind of clear observational demonstration you (and I) would want. In fact, there isn't even very much one-component velocity data on individual stars near the centers of clusters from Hubble. I was part of a team proposing to do more such work last year but our proposal was turned down because of the enormous amount of telescope time it would require to get useful data. We are optimistic that a new instrument to be installed on Hubble next year will make this project less time-consuming and we are starting now to prepare a new proposal to try again. That will, however, still be only one velocity component - but better one than none is our attitude.

Kyle Cudworth

Astronomer whose career often specialized in the motions of stars within star clusters.