



## Comments on the 2016 Award of APS Medal for Exceptional Achievement in Research

—a big step backward in physics of APS—

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### Abstract

The 2016 APS (American Physical Society) Medal for Exceptional Achievement in Research awarded to E. Witten for discoveries in the mathematical structure of quantum field theory, is indeed exceptional because there is no experimental support. This would be a big step backward from Galileo's experimental-based tradition. Moreover, the Selection Committee of APS was unaware that Witten does not understand general relativity and actually has made mathematical and physical mistakes that leads to the errors on general relativity in the press release of the 1993 Nobel Committee for Physics. However, an unexpected benefit of this award is that it leads to the exposition on the shortcomings in mathematics and physics of APS.

### Key Words

Einstein's equivalence principle;  $E = mc^2$ ; dynamic solution; repulsive charge-mass interaction.

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The 2016 APS Medal for exceptional achievement in research was announced (see Appendix). The recipient is Edward Witten of the Institute for Advanced Study. At first, I was pleased for the recipient is from the Institute for Advanced Study. However, upon reading the announcement, I was puzzled that such an award in physics actually does not have any achievement supported by experiments. Thus, this is indeed an exceptional award in Galileo's standard for an achievement in physics.

Since Galileo, we have learned that an achievement in physics must be supported by experiments; otherwise it could be completely wrong. Galileo's achievement is that he showed that the claim of Aristotle, an authority of his time, on the free fall of a neutral object is incorrect. Thus, Galileo sets the standard that an achievement in physics must be supported by experiments.

Now, we should look for experimental supports for awarding the APS medal. APS announced that the medal recognizes contributions of the highest level that advance our knowledge and understanding of the physical universe in all its facets. However, upon close examination, it is only for his "discoveries in the mathematical structure of quantum physics". The supporting statements are only, "He is widely regarded as one of the world's leading theorists in a number of areas, including string theory and quantum gravity, Witten is also the originator of M theory, which resolved perceived conflict between five competing string theorems and sparked a resurgence of research widely known as the second superstring revolution." However, since the M theory has not produced any verifiable predictions, all the claims are based on subjective judgments that Galileo tried to avoid.

Finally, APS President Samuel Aronson claimed "Witten's achievements in mathematical physics have had profound effects on many areas of active research. This award sets a very high standard for the prestigious new prize." In short, there is no mention of experimental supports for Witten's achievements. Obviously, this very "high standard" has no experimental basis. Moreover, Witten has already made many mistakes in mathematical physics. For instance, he failed to see the non-existence of dynamic solution for the Einstein equation [1] and he also failed to see the repulsive gravitation [2], which has been verified by experiments [3-5]. Thus, his work in general relativity is actually invalid.

It is clear also that the claimed Witten's achievements have no experimental supports since it is known that both quantum gravity and string theory have no experimentally verifiable results. In fact, both theories still are at most in the stage of speculation. Thus, the APS Medal for Exceptional Achievement awarded to Witten is clearly a big step backward from the time of Galileo. If the APS wants to boost up research spirit in these areas, this is a completely wrong approach.

Moreover, Witten is essentially a mathematician at heart although he often make mistakes in mathematics. He was asked once what is most important in physics, and his answer was self-consistency, a standard answer for a mathematician. He probably believed incorrectly that physics can progress with out the help of experiments. However, for a physicists, the correct answer was in agreement with experiment because in physics we often have inconsistency. It is well-known that quantum theory is often inconsistent with classical theory.

Witten was graduated in history, and thus his understanding of pure mathematics is likely half-baked. Due to inadequacy in pure mathematics like many physicists such as Pauli [6], Witten also does not understand Einstein's equivalence principle, and thus agrees with the misinterpretation of Wheeler [7, 8]. He also does not know that the Einstein equation does not have any dynamic solution [9, 10] because he incorrectly believed that linearization of the Einstein equation always produces an approximate solution for the Einstein equation [11]. Therefore, Witten [12] adapted Yau's invalid view [13, 14] based on the invalidly assumed existence of dynamic solution for the Einstein equation (the



unique coupling sign leads to the non-existence of bounded dynamic solutions [1]), and proved another version of the misleading theorem on energy. However, because the mathematicians in charge do not understand physics [14], Witten was awarded the Fields Medal in 1990.

A consequence of Witten's error is that the 1993 Nobel Committee for Physics [15] gave up the previous position of Gullstrand [16] on the invalidity of the Einstein equation for the dynamic case. Thus, it is necessary to point out and rectify Witten's error. Due to inadequacy in mathematics, Eric J. Weinberg, Editor of the Physical Review D, also incorrectly believed that linearization can always produce an approximate solution for the Einstein equation [11] just as the Wheeler School believed [7, 8]. Fortunately, it is proven in 1995 that the Einstein equation indeed has no dynamic solution [9, 10].

All claims on the existence of dynamic solutions from theorists such as Misner, Thorne & Wheeler [7], Christodoulou & Klainerman [17], and Wald [18] are proven as due to various errors in mathematics [19]. Theorists such as Yau, Witten, Hawking, Penrose, and Eric J. Weinberg have never tried to obtain a dynamic solution, and their claim is based only their faith on Einstein.

Many theorists have mistaken because they believed that all the coupling constants should have the same sign due to  $E = mc^2$ . Apparently, Witten also did not know that there are three experiments [4] against the validity of  $E = mc^2$ .

Moreover, Witten does not know that the notion of photons is a necessary consequence of general relativity [20]. He also does not know the need of gravitational radiation reaction force in general relativity [19]. He also does not know the existence of the repulsive charge-mass interaction [4]. Therefore, it is clear that Witten does not understand general relativity. Thus, the fact that Witten is regarded as a leader in string theory, may reflect just the inadequacy of such theorists in mathematics and physics. In short, the award of APS Medal to Witten would wrongly boost his status as a theorist, and thus would further mislead that his errors would be regarded as correct. We should learn at least from the errors of the 1993 Nobel Committee for Physics [21].

In conclusion, the APS Medal award of exceptional achievement to Witten, not only having no experimental supports, but also ignoring his errors that damage general relativity, is highly inappropriate. A merit of this award is, however, exposing the shortcomings in mathematics and physics of the Selection Committee of American Physical Society. Then, it would open an opportunity of rectifying the errors of the 1993 Nobel Prize Committee for Physics [21], and thus recovers the honor of Gullstrand [16], Chairman (1922-1929) of the Nobel Prize Committee for Physics.

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## Endnotes:

- 1) The Institute for Advanced Study has a big name. However, few people realized that Einstein did not make any progress in general relativity since he was there.
- 2) Moreover, this 1993 Nobel Committee even abandoned Einstein's equivalence principle [15].
- 3) After 1993, errors of Christodoulou [22] were greatly honored by the following prize and honors: [MacArthur Fellows Award](#) (1993); [Bôcher Memorial Prize](#) (1999); Member of [American Academy of Arts and Sciences](#) (2001); [Tomalla Foundation Prize](#) (2008); [Shaw Prize](#) (2011); Member of [U.S. National Academy of Sciences](#) (2012). The reason is that members of the selection committees often based their judgment on some well-known prizes, but few would take the trouble to examine the work of the candidate. For instance, Yum-Tong Siu of Harvard University, who does not understand non-linear mathematics or general relativity, approved to award Christodoulou a 2011 Shaw Prize. Perhaps, such a practice is mainly responsible for the undeserved honors. Many physicists still do not know that the formula  $E = mc^2$  is not always valid because they do not even know the three experiments [4] that show such a formula is invalid.
- 4) Many physicists, for instance including those from Harvard University, Princeton University, Princeton for Advanced Study, Stanford University, MIT (at MIT nobody understand general relativity after P. Morrison passed away in 2005), and Caltech still do not know that the formula  $E = mc^2$  is not always valid because they do not even know the three experiments [4] that show such a formula is invalid. Currently, those Schools are dominated by errors of the Wheeler School because they failed in understanding non-linear mathematics.
- 5) One should not be too surprised on the incompetence of physicists in pure mathematics since almost everybody in the field of general relativity misinterpreted Einstein's equivalence principle as shown in the British Encyclopedia [8]. According to Dr. D. Kulp, none of the editors of APS has a background in pure mathematics.
- 6) Homer Neal, Chairman of the Selection Committee, for instance, is a particle physicist, but does not have a strong background in mathematics or general relativity.



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## Appendix: Edward Witten Inaugural APS Medal for Exceptional Achievement in Research

### 2016 APS Medal for Exceptional Achievement in Research - congratulations to Edward Witten

Edward Witten, of the Institute for Advanced Study, is the first person to win the American Physical Society's Medal for Exceptional Achievement in Research. The medal recognizes contributions of the highest level that advance our knowledge and understanding of the physical universe in all its facets, and is presented along with a \$50,000 prize.

The [2016 APS Medal citation](#) honors Witten for "discoveries in the mathematical structure of quantum field theory that have opened new paths in all areas of quantum physics." He is widely regarded as one of the world's leading theorists in a number of areas, including string theory and quantum gravity. Witten is also the originator of M-theory, which resolved perceived conflicts between five competing string theories and sparked a resurgence of research widely known as the second superstring revolution.

"The Society is extremely pleased to award its first Medal for Exceptional Achievement in Research to Professor Witten," said APS President Samuel Aronson. "Witten's achievements in mathematical physics have had profound effects on many



areas of active theoretical research. This award sets a very high standard for this prestigious new prize.”

The [APS Medal for Exceptional Achievement in Research](#) is the Society’s largest award eligible to physicists without regard to discipline. The medal is funded by a generous endowment from entrepreneur Jay Jones.



**Selection Committee Members:** Homer Neal (Chair), Nick Bigelow, Jim Chelikowsky, Cary Forest, Miriam Forman, Tim Gay, Steven Gottlieb, Frances Hellman, Ann Karagozian, Mark Ediger, Gail McLaughlin, Amy Mullin, Jose Onuchic, Michael Tuts, Thomas Roser.

### 評論 2016 年的美國物理學會在研究上的特別成就獎

美國物理學會在物理上後退的一大步 2016 年的美國物理學會在研究上的特別成就獎 给予了 E. Witten 在量子場論中數學結構的發現, 因為沒實驗上的支持這真是個很特別的獎. 這是自從加里略建立了以實驗為基本的物理學傳統上的大步倒退. 而且學會的選擇委員會還忽視了不但 Witten 並不明白廣義相對論, 而且他所造成的數學上和物理上的錯誤導致 1993 年的諾貝爾獎委員會在發佈上廣義相對論中的錯誤. 因此, 這獎一個意外的收益是曝露了美國物理學會在數學上和物理上缺點.