

# The importance of recognising fringe science

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## Abstract

In book stores and on the internet, numerous expositions can be found of what could be called ‘fringe science’. They generally consist of theories and ideas that run against long-accepted wisdom in science. Some of these concoctions are easily recognised as such, but some do have the air of displaying important oversights of standard theories, in what sounds like a professional language. For young, beginning students of science these may be dangerous traps, and falling for them might bring real damage to their careers. We attempt to describe what we mean by ‘fringe science’, how to recognise it, and also where it borders to real science.

The direct cause for this paper is a rather vicious recent resurgence in theoretical physics, a field where recognising fringe science should be easy. We are worried about the situation in other doctrines.

This is not a scientific paper in the usual sense. We try to avoid belligerence.

Version September 2017. Typeset November 15, 2017

# 1 Introduction

Modern science is seen as a gigantic intellectual edifice comprising all that is known about the natural world, including its lifeless as well as its living inhabitants. All scientific findings hang together, and whenever an apparent contradiction is spotted, scientists relentlessly investigate the situation for as long as is needed to figure out what the true situation is. We are not happy with incomplete or dubious answers; as long as there is no absolute clarity, we continue to doubt until we might feel satisfied that we are completely in control. Even then, doubts may reappear every now and then, and it may even happen that newcomers and amateur scientists manage to punch a hole in established knowledge.

This does not happen often, but it is not excluded, and all sincere concerns about our understanding are reacted upon meticulously.

Such concerns must be well-motivated and well documented. In the case of amateur scientists, the professionals often immediately notice the weak spots in their stories, and in a vast majority of cases, no further reactions are needed at all. We receive letters and mails all the time, and the senders often fail to comprehend the reasons for the immediate rejection of their ideas and findings. They often blame the scientific establishment, suspecting them of some sort of malice. What then happens differs from case to case. This author usually advises amateur scientists to take their subjects more professionally, by getting hold of university lecture notes, or better still, by entering universities and following regular courses from beginning to end.

These should be good advices, but the practitioners of science come from many different places and not all recommendations apply to all of them. They certainly cannot all be cured from having ill-motivated beliefs, including the belief that they are the victims of malicious actions by the “scientific establishment”.

In reality, they are the victims of their own ignorance, but this, of course, is difficult to explain. The ignorance is viciously denied. Now one might have thought that such things should not happen often in theoretical physics. Our field is completely controlled by solid mathematical analysis, so it may be surprising that, even here, we have to deal with a number of cases. Amazingly, these amateurs form groups in mutual admiration, and appear to form a mighty, and indeed quite colourful, army against the sturdy edifice of what is seen as an evil empire, called mainstream science.

If this can happen in theoretical physics, what will the situation be like in other fields of science? I can only imagine that the situation in biology, medicine, or history, will be far worse. Many fields of science are not upheld by solid mathematical constructions; these hardly exist in many circumstances. The life sciences proceed by careful examinations of the innumerable life forms found on this planet, and perceived suspicions concerning the existence of evil powers here, will be a lot more difficult to combat. And what about political science and law? Here, the subject itself is about the feelings of well-being by

humans. In this, the border between fringe political principles and really valid ideas will be much more difficult to locate, if even it exists. I would be interested in comments from that side.

Back to physics. One might argue that a serious student, equipped with functional amounts of common sense and intelligence, will be able to steer away from the numerous accounts on the internet by misled amateurs. But in some cases this is not quite so easy. The authors of fringe papers on the net appear to be amazingly intelligent, and they succeed to hide the shortcomings of their self-proclaimed theories very well. I noticed in some occasions that they widely receive warm applause by an audience of equal-minded enthusiasts on their weblogs. I find this worrying. Can't these people punch holes in the ill-conceived concoctions? Apparently not. How can beginning students select the right papers to read and study? We should advise them. This motivated this paper.

## 2 Characteristics

There are a number of characteristics that will enable one to judge whether a paper that appeared on the web is real science or not. Papers not to be taken seriously often share the following:

- Polemics. Fringe papers often claim that a whole gang of practitioners of mainstream science are defending “wrong” notions, and that they conspire just to ensure their university positions and their salaries.
- Arguments are employed that are quite unconventional as compared with the standard theories, while they nevertheless may sound professional.
- The major parts of these arguments explain why the standard theories are completely untenable, and how they should be replaced. Quantitative analysis as to how one should replace the standard theories is rarely provided; they think that it suffices to state that the standard theories are wrong, so that the things they replace them with need no further justifications.
- The authors have not been able to get their work published in the scientific journals that would have been chosen by professionals. Such journals are peer reviewed, and no reviewer would have approved the work. This is because professional reviewers have no difficulty spotting fatal shortcomings.

Such authors even fail to get their work published on the web service that is freely accessible to investigators with a university affiliation. This service is referred to as the “arXiv”; respected scientists simply send their work to this archive before it is peer reviewed. Yet arXiv does have a safety shield: if you are *not* affiliated to a university you are requested

to seek the support from an acknowledged scientist; if you get such support they will accept your papers. Fringe scientists are unable to pass this safety shield.

Now it so happens that they do have a way to get their work published on the web. It was a good idea by Philip E. Gibbs to institute a medium for those authors who otherwise cannot get their work published anywhere else. It is called “viXra” (“arXiv” spelled backwards). It is a repository for papers claimed to be scientific by their authors, but with no restrictions other than the use of proper language and decent scientific conduct. The scientific content is not judged at all, even if one can see right away that a paper does not contain acceptable science. So it is an outlet needed for people who do want to be heard. It does this job well, even if only few professional scientists ever download work from this source. When a paper is published in viXra, it is usually a sign that it is not likely to contain acceptable results. It may, but the odds against that are considerable (I do know some exceptions).

### 3 Recommendations

Most real scientists do not react at all when they get messages from members of any group of this sort, or from lone wolves, asking them to revise everything they know about science, because there are some features of modern science that they declared to be “wrong”. Scientists who do not react are called names, but they have to take in much worse insults when they do try to explain how their science works. Our motivation to try to explain this anyway is not so much our “fear” for fringe scientists themselves, but our wish to inform younger students about what science is and what it is not.

Thus; if we receive abusive mails we just ignore them. The point of concern is the followers they get. How do young people distinguish inferior science from the real thing? People who consulted the page “How to become a GOOD theoretical physicist”[1] were advised to consult lecture notes that we could select from sources at respectable universities, but we also had to advise them to search for more on the net. Rule number one is then that university based lecture notes must be given priority. Furthermore, if several unquestionable results from standard science need to be revised in one stroke, to justify one author’s claims, then it may be concluded that those claims must be taken with extreme skepticism.

Mainstream science will never stay unquestioned. Frequently, perfectly respectable tests are performed trying to detect deviations from standard wisdom. Even if the outcomes of such tests are easy to predict, these are nevertheless often approved by scientific majorities. Theories that require modifications in what we think we know, are proposed and discussed, also in the established and peer reviewed literature, but at the same time we do request that authors of such proposals give sound motivations for their ideas, explaining how their ideas might be reconciled with many earlier scientific findings. We

must always remember that science forms one unity, with innumerable cross links.

## References

- [1] G. 't Hooft, N. Gaddam, 'How to become a GOOD theoretical physicist',  
<http://www.staff.science.uu.nl/Gadda001/goodtheorist/index.html>
- [2] G. 't Hooft, 'How to become a BAD theoretical physicist',  
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