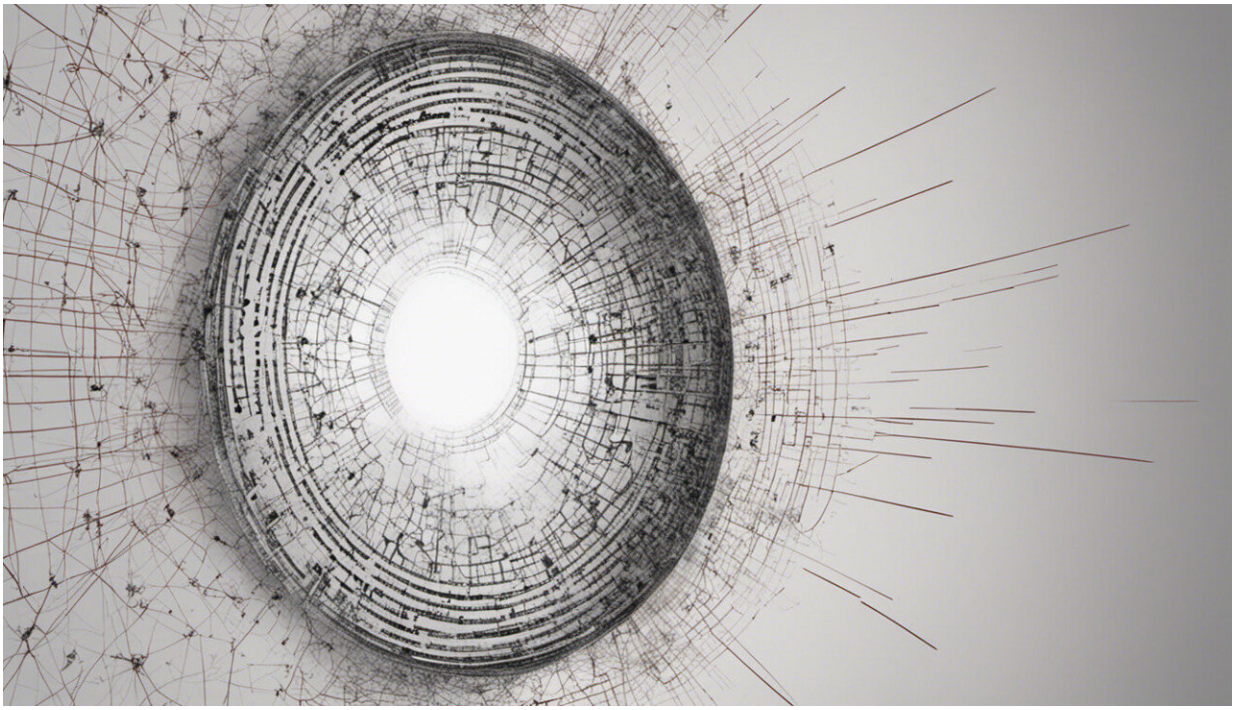
Why is Einstein's general relativity such a popular target for cranks?

November 24 2015, by Michael J. I. Brown



Credit: AI-generated image (disclaimer)

Scientists may be celebrating the 100th anniversary of Albert Einstein's general theory of relativity, but there was also a death in 1915. It was one of the many deaths of simple and intuitive physics that has happened over the past four centuries.

Today the concepts and mathematics of physics are often removed from everyday experience. Consequently, cutting edge physics is largely the domain of professional physicists, with years of university education.

But there are people who hanker for a simpler physics, toiling away on their own cosmologies. Rightly or wrongly, these people are often labelled cranks, but their endeavours tell us much about misconceptions of science, its history and what it should be.

I regularly browse open access website arxiv.org to look for the latest astrophysics research. Real astrophysics, that is. But if I want to take a look at what pseudoscientists are up to, I can browse vixra.org. That's right, "arxiv" backwards. The vixra.org website was founded by "scientists who find they are unable to submit their articles to arXiv.org" because that website's owners filter material they "consider inappropriate".

There are more than 1,800 articles on vixra.org discussing relativity and cosmology, and many don't like relativity at all. Perhaps one reason why cranks particularly dislike relativity is because it is so unlike our everyday experiences.

Einstein predicted that the passage of time is not absolute, and can slow for speeding objects and near very massive bodies such as planets, stars and black holes. Over the past century, this bizarre predication has been measured with planes, satellites, and speeding muons.

But the varying passage of time is nothing like our everyday experience, which isn't surprising as we don't swing by black holes on our way to the shops. Everyday experience is often central to cranky ideas, with the most extreme example being flat earthers.

Thus many crank theories postulate that time is absolute, because that

matches everyday experience. Of course, these crank theories are overlooking experimental data, or at least most of it.

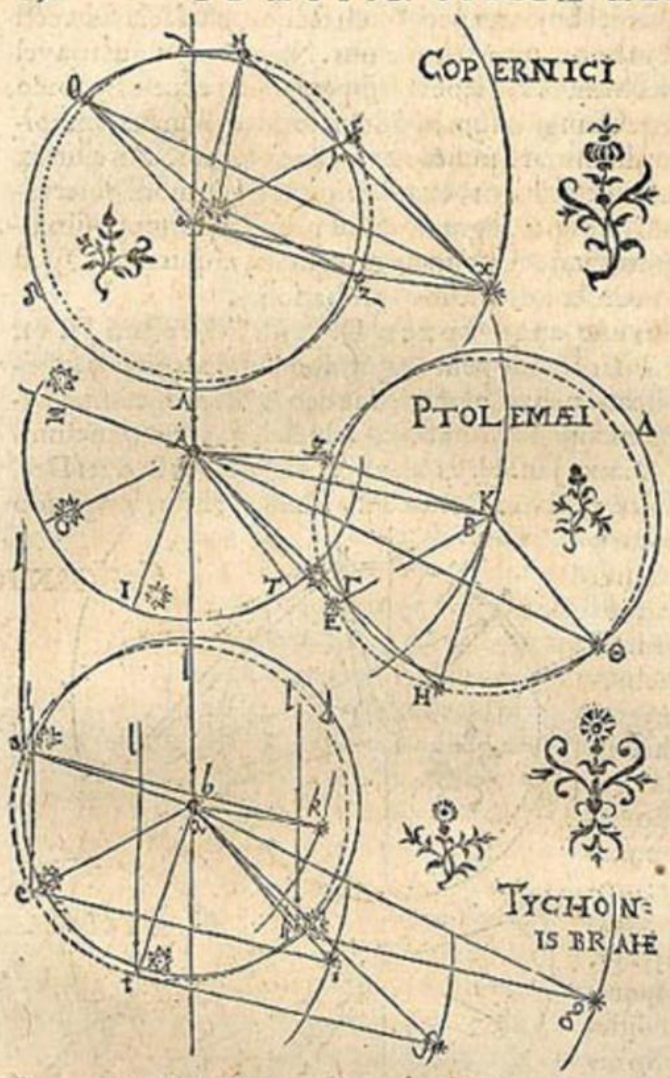
History and linearity

One of the most curious aspects of pseudoscience is an oddly linear approach to science. To be fair, this can result from an overly literal approach to popular histories of science, which emphasise pioneering work over replication.

A pivotal moment in relativity's history is Albert Michelson and Edward Morley's demonstration that the speed of light didn't depend on its direction of travel nor the motion of the Earth.

Of course, since 1887 the Michelson-Morley experiment has been confirmed many times. Modern measurements have a precision orders of magnitude better than the original 1887 Michelson-Morley experiment, but these don't feature prominently in popular histories of science.

CAP. XXIV.



SOLIS vergat in $\frac{1}{2}$ ♎: quamvis hunc gradum cap. XXV libere inquisituri sumus quasi incognitum. Et sit TERRA A. MDXC in ♑, anno MDXCII in ♒, anno MDXCIII in ♓, anno MDXCV in ♈. Et anguli ♑a♒ ♓a♈ æquales, quia a est punctum æqualitatis, & periodica Martis tempora præsupponuntur æqualia. Sitq; Planeta his quatuor vicibus in ♒, ejusq; linea apsidum aλ. Est ergo angulus ♑a♒ secundum indicium anomaliæ commutationis coæquatæ 127.5.1.

Quod visum locum Martis attinet, is die IV antecedente hora simili fuit 24.22 ♈. diurnus ejus diei esset 44. Ergo ad nostrum tempus visus fuit in 25.6 ♈. qui est situs lineæ ♑♒. Sed a♒ tendit in 15.53.45 ♉. Ergo ♑♒a est 20.47.45. Residuus igitur a♑♒ ad duos rectos est 32.7.14.

Vt igitur sinus a♑♒ ad a♒, quam dicemus esse partium 100000: sic ♑♒a ad ♑a quæsitum. Est ergo ♑a 66774.

Quod si reliquæ ♒a, ♓a, ♈a, ejusdem prodibunt longitudinis, falsum erit quod suspicor: at si diversæ, omnino vicero.

SECVNDO igitur, anno MDXCII ad nostrum momentum est longitudo coæquata 1.15.55.23: commutatio coæquata 8.24.16.34. hoc est, ♒a♒ angulus est 84.16.34. Visus est die XXIII Januar. H.VII.M.XV in 11.34 $\frac{1}{2}$ ♈ correctione per parallaxin adhibita. Et est motus bidui ejus 1.25. Ergo die XXI hora VII M.XV in 10.9 $\frac{1}{2}$ ♈ est visus. Residua scrupula horæ abjiciant dimidium minutum. Ergo angulus ♒a♒ est 35.46.23, & a♒♓ 60.3.3, & a♓ 67467 jam longior quam a♑. Sane quia SOL versus perigæum descendit, &

In the 17th century, Johannes Kepler used elegantly simple mathematics to chart the motion of Mars. Credit: Johannes Kepler / University of Sydney

Interestingly many pseudoscientists are fixated on the original Michelson-Morley experiment, and how it could be in error. This fixation assumes science is so linear that the downfall a 19th century experiment will rewrite 21st century physics. This overlooks how key theories are tested (and retested) with a myriad of experiments with greater precision and different methodologies.

Another consequence of the pseudoscientific approach to history is that debunked results from decades past are often used by buttress pseudoscientific ideas. For example, many pseudoscientists claim Dayton Miller detected "aether drift" in the 1930s. But Miller probably underestimated his errors, as far more precise studies in subsequent decades did not confirm his findings.

Unfortunately this linear and selective approach to science isn't limited to relativity. It turns up in cranky theories ranging from evolution to climate.

Climate scientist Michael E Mann is still dealing with cranky accusations about his seminal 1998 paper on the Earth's temperature history, despite the fact it has been superseded by more recent studies that achieve comparable results. Indeed, it devoured so much of Mann's time he has literally written a book about his experience.

What about the maths?

During the birth of physics, one could gain insights with relatively simple (and beautiful) mathematics. My favourite example is Johannes Kepler's charting of the orbit of Mars via triangulation.

Over subsequent centuries, the mathematics required for new physical insights has become more complex, as illustrated by Newton's use of calculus and Einstein's use of tensors. This level of mathematics is rarely in the domain of the enthusiastic but untrained amateur. So what do they do?

One option is to hark back to an earlier era. For example, trying to disprove general relativity by using the assumptions of special relativity or even Newtonian physics (again, despite the experiments to the contrary). Occasionally even numerology makes an appearance.

Another option is arguments by analogy. Analogies are useful when explaining science to a broad audience, but they aren't the be-all and end-all of science.

In pseudoscience, the analogy is taken to the point of absurdity, with sprawling articles (or blog posts) weighed down with laboured analogies rather than meaningful analyses.

Desiring simplicity but getting complexity

Perhaps the most fascinating aspect of pseudoscientific theories is they hark for simplicity, but really just displace complexity.

Ardents of the most simplistic pseudoscientific theories often project complexity onto the motives of professional scientists. How else can one explain scientists ignoring their brilliant theories? Claims of hoaxes and scams are commonplace. Although, to be honest, even I laughed out loud the first time I saw someone describe dark matter as a "modelling scam".

Again, this isn't limited to those who don't believe in relativity. Simple misunderstandings about photography, lighting and perspective are the launch pad for moon landing conspiracy theories. Naively simple approaches to science can lead to complex conspiracy theories.

Changing intuition

Some have suggested that pseudoscience is becoming more popular and the internet certainly aids the transmission of nonsense. But when I look at history I wonder if pseudoscience will decay.

In the 19th century, Samuel Rowbotham promoted Flat Earthism to large audiences via lectures that combined wit and fierce debating skills. Perhaps in the 19th century a spherical world orbiting a sun millions of kilometres away didn't seem intuitive.

But today we can fly around the globe, navigate with GPS and Skype friends in different timezones. Today, a spherical Earth is far more intuitive than it once was, and Flat Earthism is the exemplar of absurd beliefs.

Could history repeat with relativity? Already GPS utilises general relativity to achieve its amazing precision. A key plot device in the movie Interstellar was relativistic time dilation.

Perhaps with time, a greater exposure to general relativity will make it more intuitive. And if this happens, a key motivation of crank theories will be diminished.

Source: The Conversation