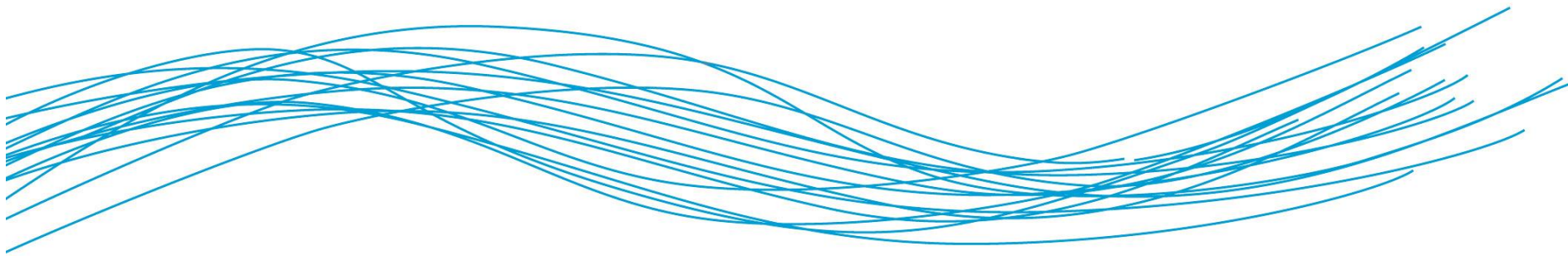


Science as the new priesthood

“What is truth now? Can we admit ignorance?”

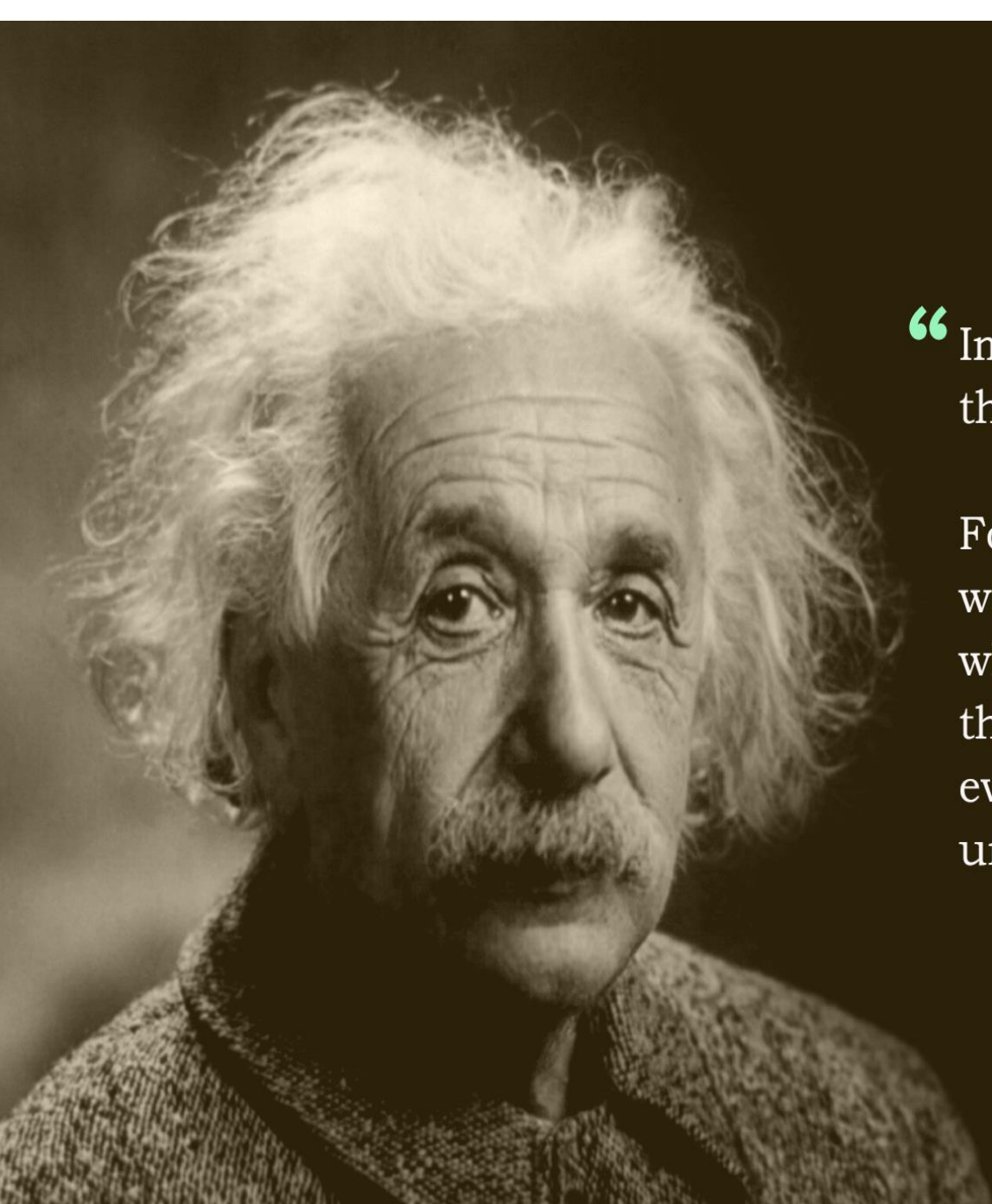


John Wood

(Chair of Christians in Science Trust)

Atomic Anarchist at Large





“Imagination is more important than knowledge.

For knowledge is limited to all we now know and understand, while imagination embraces the entire world and all there ever will be to know and understand.”

– Albert Einstein



**Remainers and Leavers
are equally to blame**

James Kirkup
Page 24



Comment

We're in trouble if we can't trust scientists

The debunking of several famous psychology experiments is an important lesson in questioning conventional wisdom

**David
Aaronovitch**



longer be replicated for ethical reasons but it emerged that many of the participants simply hadn't believed that they were really administering shocks.

Now it transpires that Milgram suppressed part of a follow-up questionnaire that indicated those

in only half. For whatever reason, for the other half, there were doubts about their accuracy or usefulness.

This research backs up an impression gained by many of us who have time to dive into some of the dozens of research papers published every week. Which is that

ALAMY



But it does matter, partly because it leaves us knowing that we are still looking for the answers to some big questions. When I exposed the 300 cameras fiction, I was shocked by the attitude of the academics responsible which, summarised, was "who cares



Science Says Drinking Coffee Helps People Slow Aging, Lose Weight, and Cheat Death. These Fascinating Studies Explain Why It's a Miracle Drink

Not drinking coffee? Maybe now's the time to start.

By Bill Murphy Jr. [@BillMurphyJr](http://www.billmurphyjr.com)





Study says eating ice cream for breakfast may help improve mental performance

The study, conducted by professor Yoshihiko Koga of Kyorin University, says eating ice cream can improve alertness and mental performance.

In the study, Koga compared the brain activity of participants who had ice cream right after waking up with those who did not. Participants who had ice cream had faster reaction times and less mental irritation.





What is truth? The role of the media



Misled and confused? Telling the public about MMR vaccine safety

C J Clements¹, S Ratzan²

THE PUBLIC FEELS MISLED

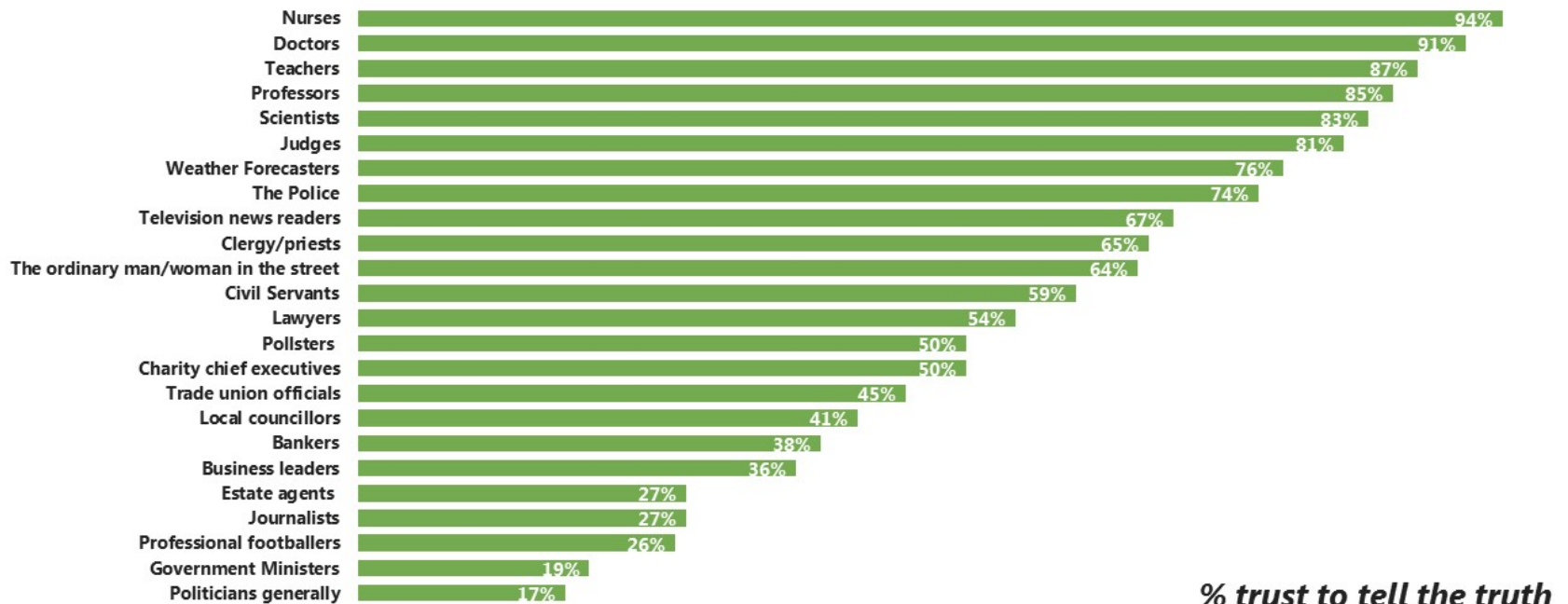
The British public have been fed by the media on a mixed diet of scientific evidence, theories, views, and other verbal roughage. Because of the huge amount of media coverage of the safety of MMR, the public, not unreasonably, have come to the conclusion that there is no smoke without fire; there must be some truth in all this alarmism. They are not convinced that vaccines are safe; they are not sure who to listen to and trust. They are reverting to the belief that it is safer to have the disease than have their children vaccinated. And even if children were to get the disease, they argue, it is not serious.



Who do we trust?

Veracity Index 2017 – all professions overview

"Now I will read you a list of different types of people. For each would you tell me if you generally trust them to tell the truth, or not?"



% trust to tell the truth





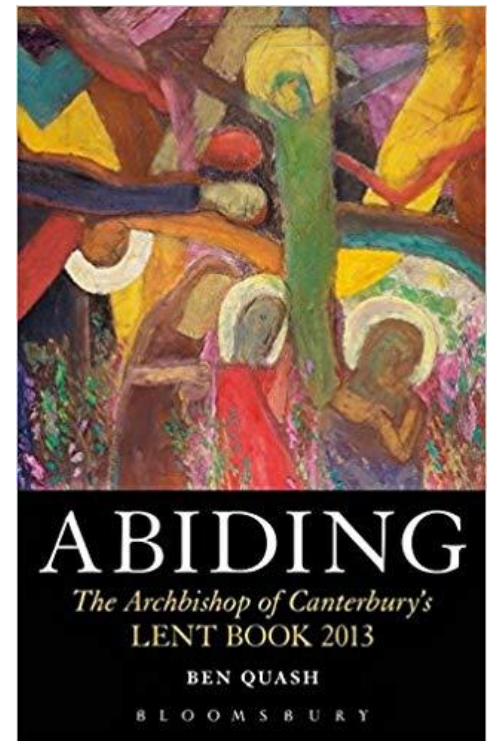


For a Christian, the truth is personal and relational

“If you abide in my word, you are truly my disciples, ³² and you will know the truth, and the truth will set you free.”

On what basis is science truthful? Have we bartered truth for the sake of the next grant, promotion, investment or sales? Alternatively do we only see one aspect of a much larger truth.

Christian scientists, I believe are specifically called to look at the big picture



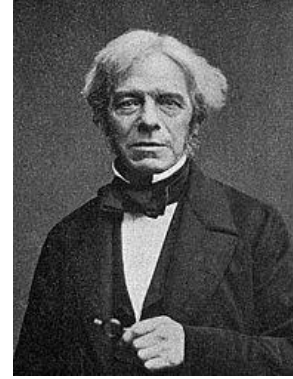
It's an old problem!



“STRANGE TIMES ARE THESE IN WHICH WE LIVE WHEN OLD AND YOUNG ARE TAUGHT FALSEHOODS IN SCHOOL. AND THE PERSON THAT DARES TO TELL THE TRUTH IS CALLED AT ONCE A LUNATIC AND FOOL.”

~ PLATO (427 BC)

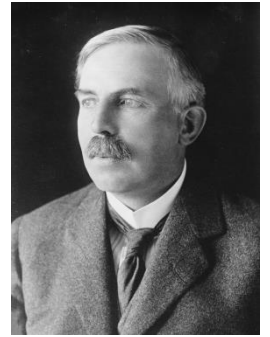
Michael Faraday



- Nothing is too wonderful to be true if it be consistent with the laws of nature
- It is the great beauty of our science, that advancement in it, whether in a degree great or small, instead of exhausting the subjects of research, opens the doors to further and more abundant knowledge, overflowing with beauty and utility.
- I am no poet, but if you think for yourselves, as I proceed, the facts will form a poem in your minds
- Why, sir, there is every probability that you will soon be able to tax it!"



Ernst Rutherford



- We've got no **money** so we've got to think.
- **All science is either physics or stamp collecting.**
- An alleged scientific discovery has no merit unless it can be explained to a barmaid.
- Don't let me catch anyone talking about the Universe in my department.



1 PHYSICS

1.1 History

Aristotle said a bunch of stuff that was wrong. Galileo and Newton fixed things up. Then Einstein broke everything again. Now, we've basically got it all worked out, except for small stuff, big stuff, hot stuff, cold stuff, fast stuff, heavy stuff, dark stuff, turbulence, and the concept of time.



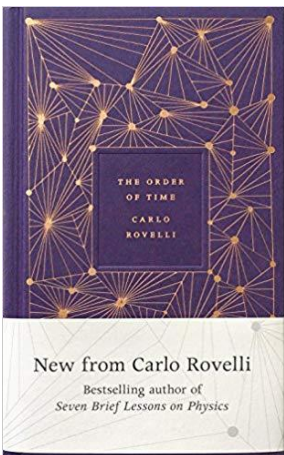


Rebellion is among the deepest roots of science: the refusal to accept the present order of things....Perhaps poetry is another of sciences deepest roots: the capacity to see beyond the visible Time defined by the second law of thermodynamics.

Heat can only pass from a hotter body to a cooler, not the other way round. So any change in entropy cannot be negative

Quantised time at the Plank level of a hundred millionth of a trillionth of a trillionth of a second. **Does time exist at this point?**

The time of physics is, ultimately, the expression of ignorance of the world. **Time is ignorance.**



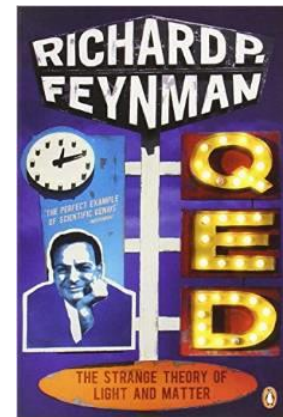
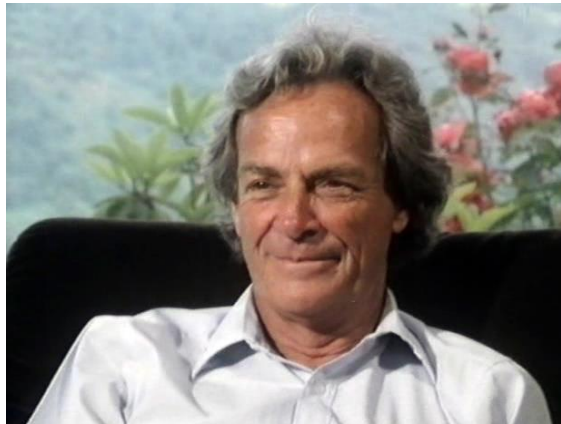
“Nothing is valid always and everywhere. Sooner or later we always come across something that is new.”





Richard Feynman Quotes

- “I think it's much more interesting to live not knowing than to have answers which might be wrong.”
- **“If you thought that science was certain - well, that is just an error on your part.”**



From the **“Strange theory of light and matter lectures:”**

...if you think I am going to explain it to you so you can understand it. **No**, you're not going to be able to understand it. Why, then, am I going to bother you with all this? Why are you going to sit here all this time, when you won't be able to understand what I am going to say? It is my task to convince you not to turn away because you don't understand it. You see my physics students don't understand it either. That is because I don't understand it. Nobody does.



What can light do?

Among many things

- It illuminates (reading light)
- It burns (sunburn)
- It transforms (lasers are used to change surfaces)
- It communicates (fibre communications)
- It manipulates (laser tweezers)
- It accelerates (electrons by high energy lasers)
- It interrogates (diffraction and reflection)



Light in the gospel of John

33 references to light

- “The light shines in the darkness but the darkness has not understood/overcome it.”
- “This is the judgment, that the Light has come into the world, and men loved the darkness rather than the Light, for their deeds were evil. "For everyone who does evil hates the Light, and does not come to the Light for fear that his deeds will be exposed....”
- "I am the light of the world. Whoever follows me will never walk in darkness, but will have the light of life."



Prof. Peter Fletcher

Darwin Lecture January 2019

- **Conclusion:**

The visual system, in its structure and function confers a ready made tendency to create perceptions – to see visions

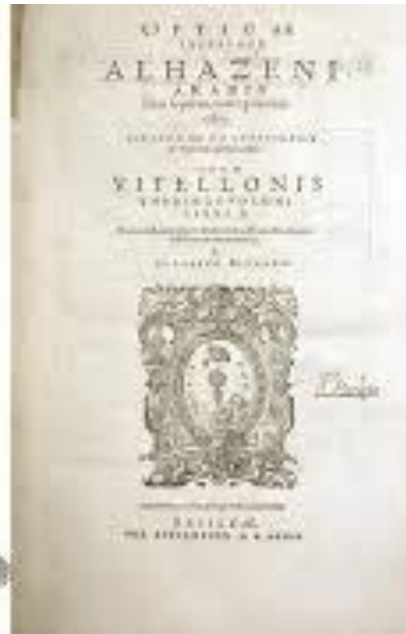
- **Idea 3**

To perceive is ultimately an act of inference – a multi-stage process concocted of two key ingredients – expectation and input. This entails a powerful but perilous way of seeing our world



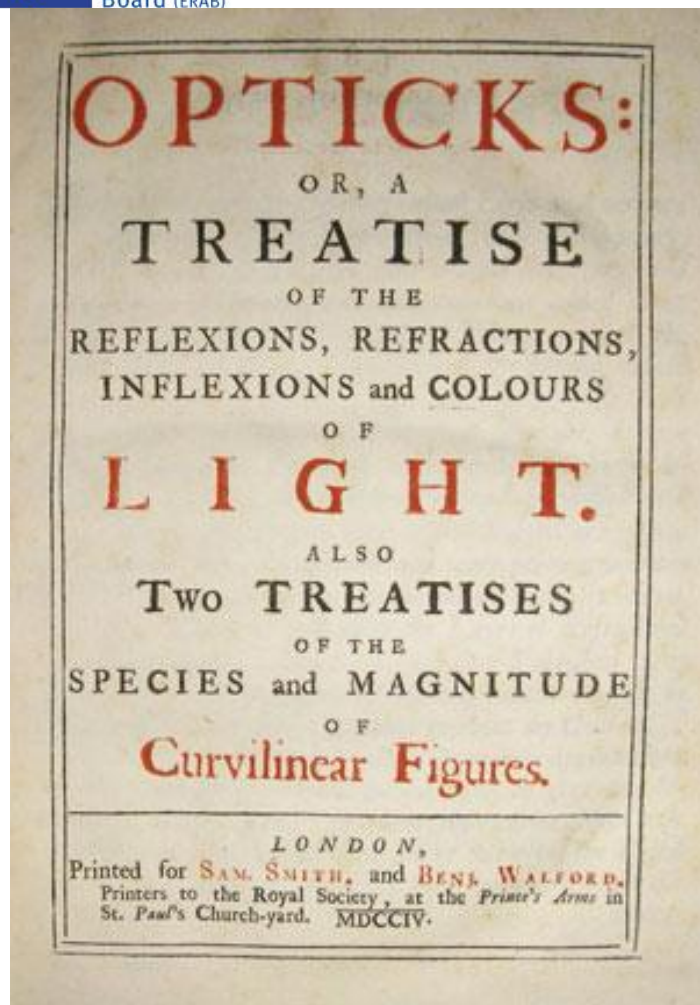


Ibn Al-Haytham and the Legacy of Arabic Optics



Adinor's Collection







TRAITE DE LA LUMIERE.

Où sont expliquées

Les causes, de ce qui luy arrive

Dans la REFLEXION, & dans la REFRACTION.

Et particulièrement

Dans l'étrange REFRACTION

DV CRISTAL D'ISLANDE.

Par C. H. D. Z.

Avec un Discours de la Cause

DE LA PESANTEUR.



A L E I D E,

Chez PIERRE VANDER A A, Marchand Libraire,
M D C X C.

TREATISE ON LIGHT.

In which are explained

The causes of that which occurs

In REFLEXION, & in REFRACTION.

And particularly

In the strange REFRACTION

OF ICELAND CRYSTAL.

By CHRISTIAAN HUYGENS.

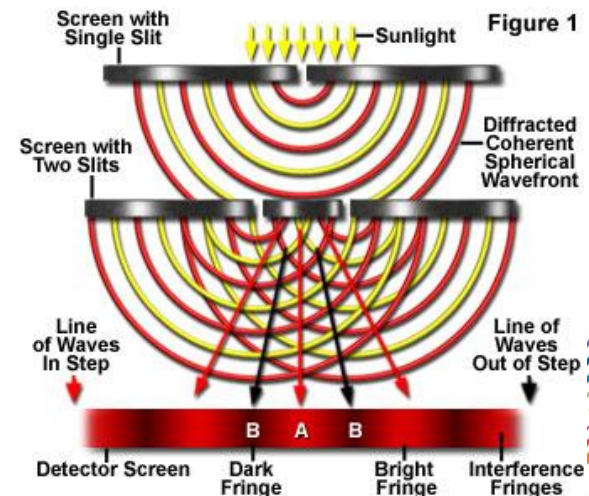
Rendered into English

By SILVANUS P. THOMPSON.

DOVER PUBLICATIONS, INC.
NEW YORK NEW YORK

"All points on a wavefront can be considered as *point sources* for the production of *spherical secondary wavelets*. At a later time, the new position of the wavefront will be the *surface of tangency* to these secondary wavelets."

Thomas Young's Double Slit Experiment

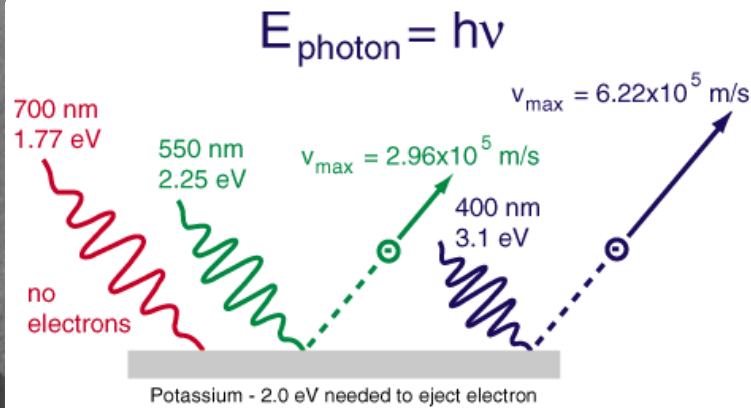
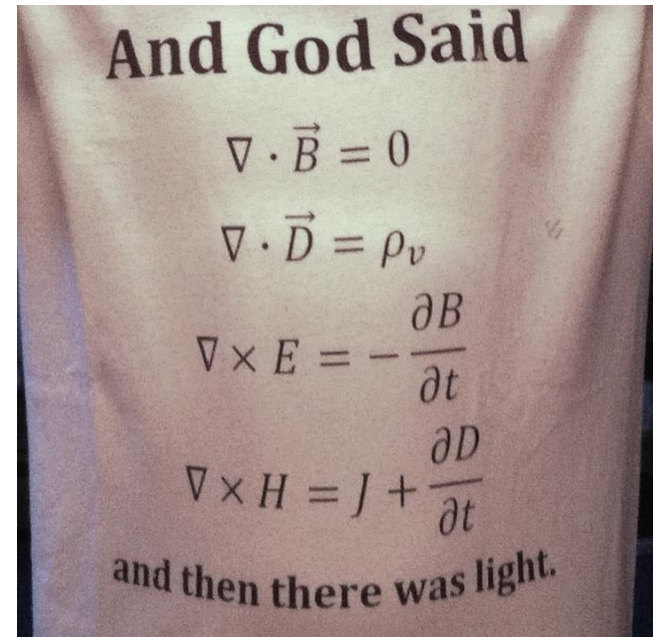


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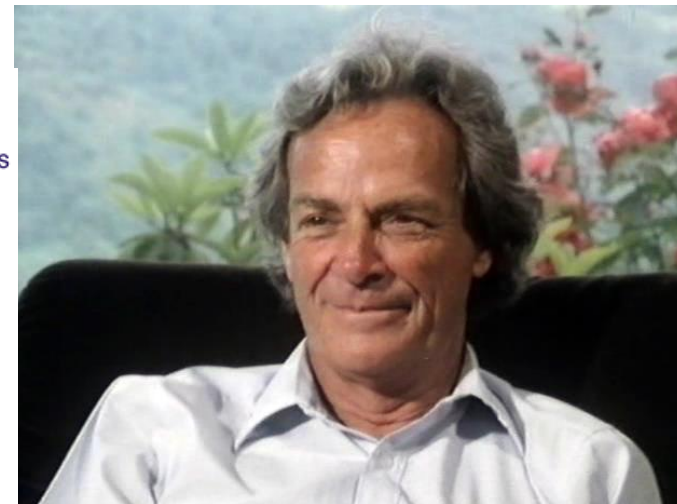


"But I should be very sorry if an interpretation founded on a most conjectural scientific hypothesis were to get fastened to the text in *Genesis*... The rate of change of scientific hypothesis is naturally much more rapid than that of Biblical interpretations, so that if an interpretation is founded on such an hypothesis, it may help to keep the hypothesis above ground long after it ought to be buried and forgotten."

James Clerk Maxwell



Photoelectric effect



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"But I should be very sorry if an interpretation founded on a most conjectural scientific hypothesis were to get fastened to the text in *Genesis*... The rate of change of scientific hypothesis is naturally much more rapid than that of Biblical interpretations, so that if an interpretation is founded on such an hypothesis, it may help to keep the hypothesis above ground long after it ought to be buried and forgotten."

James Clerk Maxwell



Tension and dissonance

- "It seems likely that there is another way of dealing with incompatibles and opposites within the mind, provided one is sufficiently robust to stand the tension.; and this is the way adopted by creative people. One characteristic of creative people is just this **ability to tolerate dissonance**. They see problems that others do not see;; and do not attempt to deny their existence. Ultimately the problem may be solved, and a new whole made out of what was previously incompatible, **but it is the creative person's tolerance of discomfort of dissonance that makes new solutions possible.**" (From "White Mars" by Brian Aldiss and Roger Penrose).



Tension of opposites

“Religion is a culture of faith; science is a culture of doubt.”

V

“Science is a culture of faith; religion is a culture of doubt”

Honest doubt has a role in both. Is there an embracing theology of doubt that can assist science?

The problems are with “keyhole” theology and “keyhole” science. E.g. We can only investigate 5% of the universe. 68% is dark energy, 27% dark matter. We make it worse by subdividing disciplines more and more



The trouble with keyhole theology and keyhole science

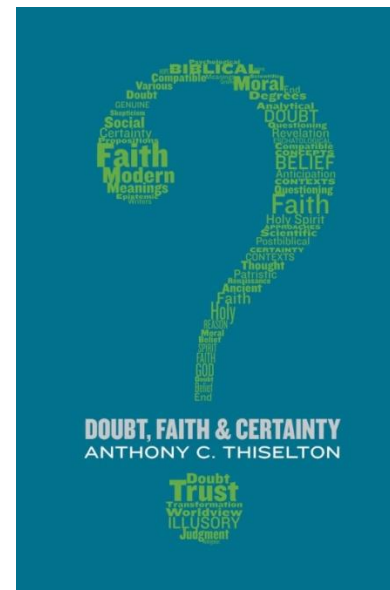
“You don’t see enough to come to a conclusion, but once you’ve seen a little it’s difficult to resist trying...Being insistent as well as inquisitive, we refuse to suspend judgement and our wrong conclusions so misrepresent God that we end up doubting him”

“Doubt – Faith in two minds” Os Guinness



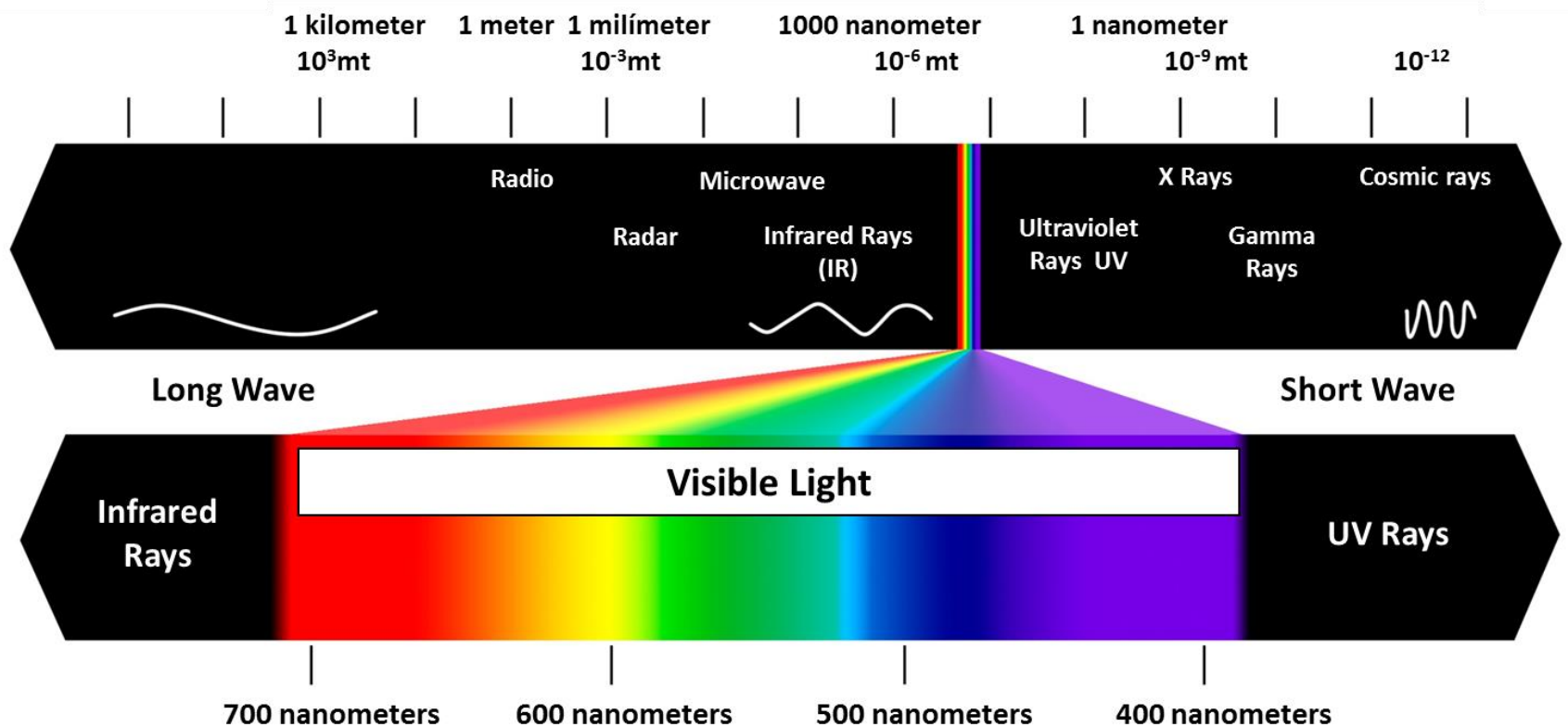
“Doubt and questioning may open the door to new insights and a need to a needed reappraisal of faith or belief.... Some who claim for themselves absence of doubt and possession of utter certainty may possibly be masking a degree of arrogance behind a display of piety... The biblical narratives anticipate partial certainty which is to be vindicated in the future

“For now we see in a mirror, dimly, but then we will see face to face. Now I know only in part; then I will know fully, even as I have been fully known.” St.Paul.





What do we really see?



Light Illuminates.

To what extent is Theology stuck in the visible, is it dangerous to go beyond?

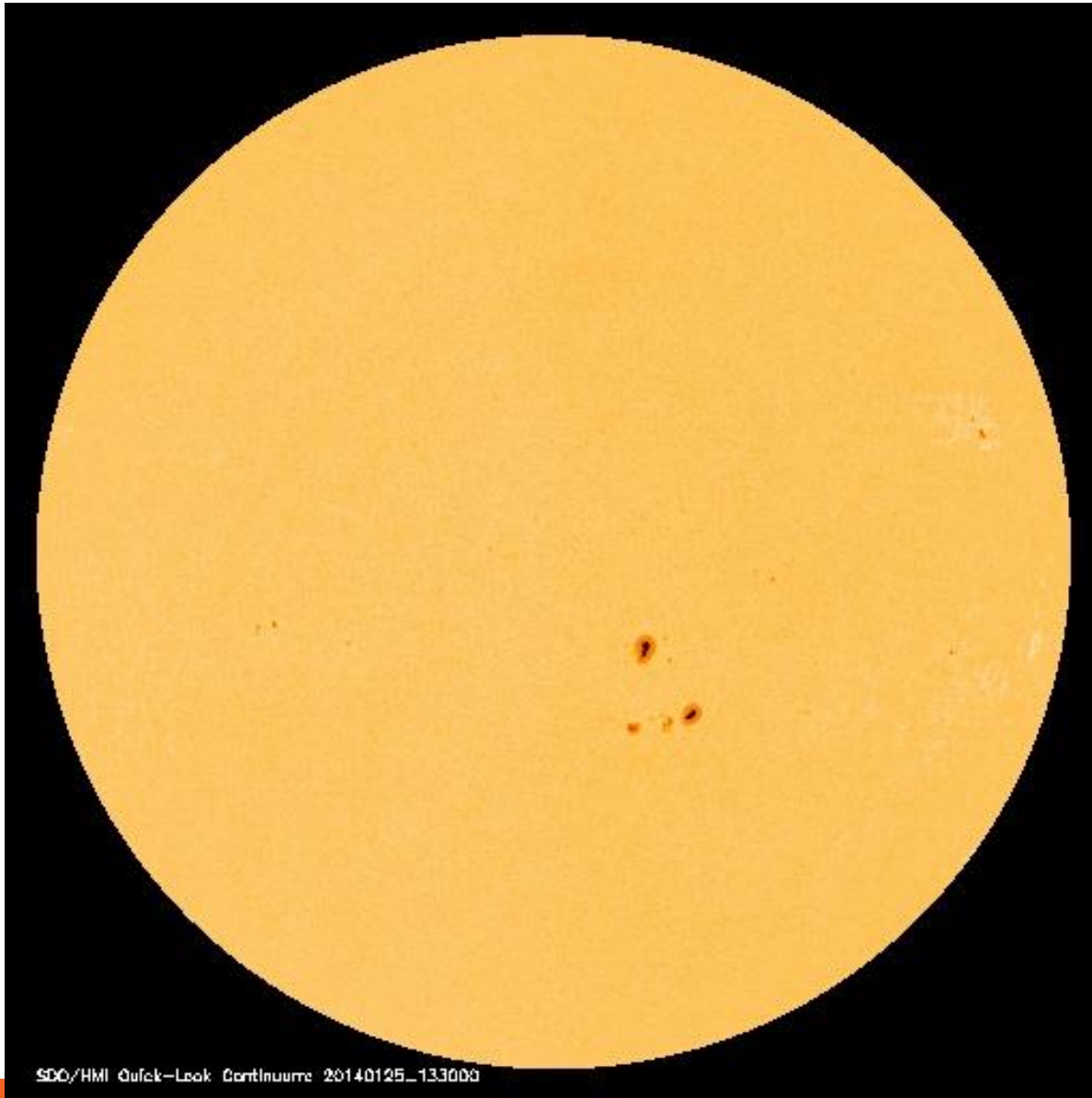
- You have searched me, LORD,
and you know me.
You know when I sit and when I rise;
you perceive my thoughts from afar.
You discern my going out and my lying down;
you are familiar with all my ways (Psalm 139)
- “For now we see only a reflection as in a mirror; then we shall see face to face. Now I know in part; then I shall know fully, even as I am fully known.” (1 Corinthians 13).





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Seeing is believing!

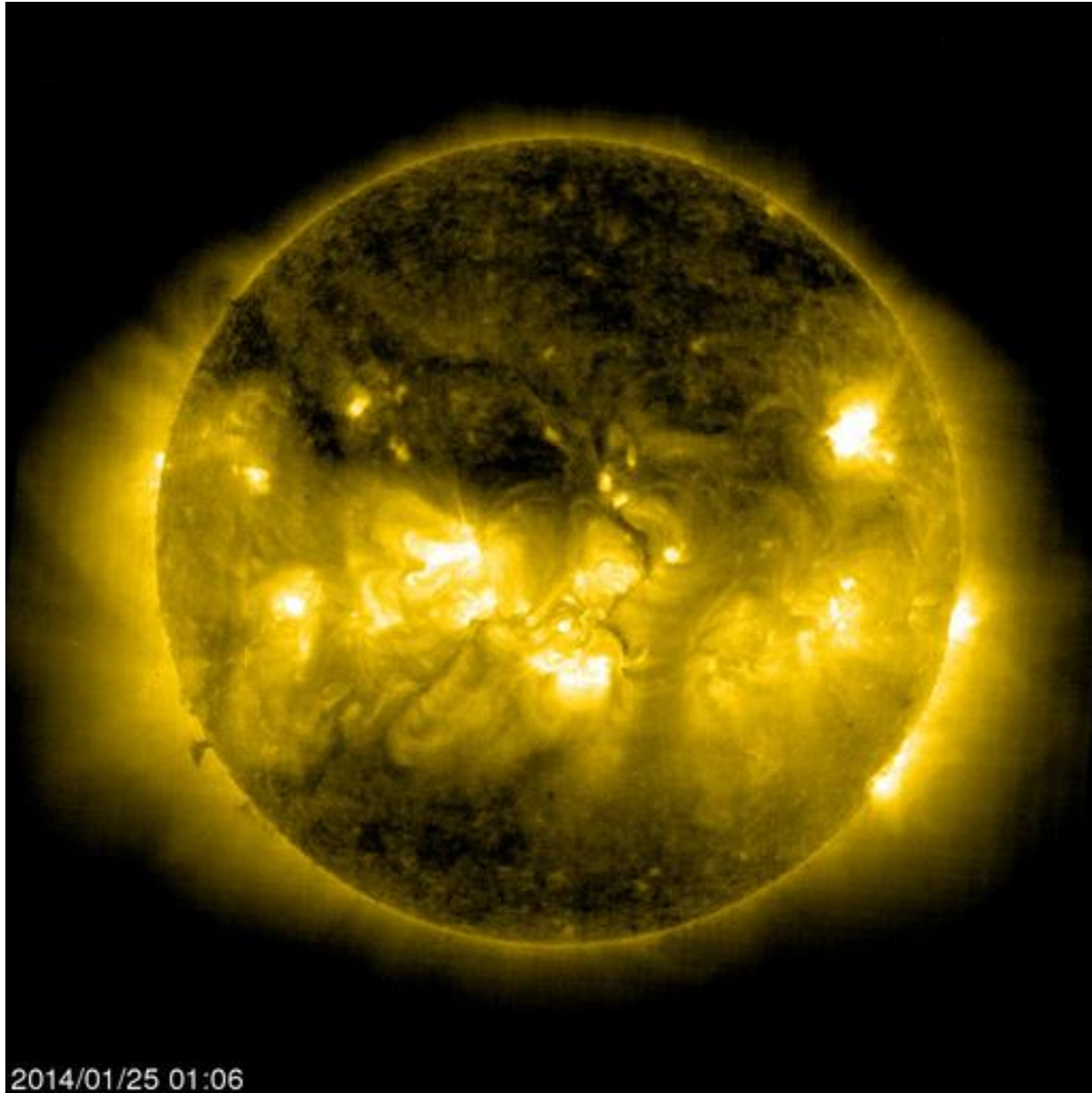


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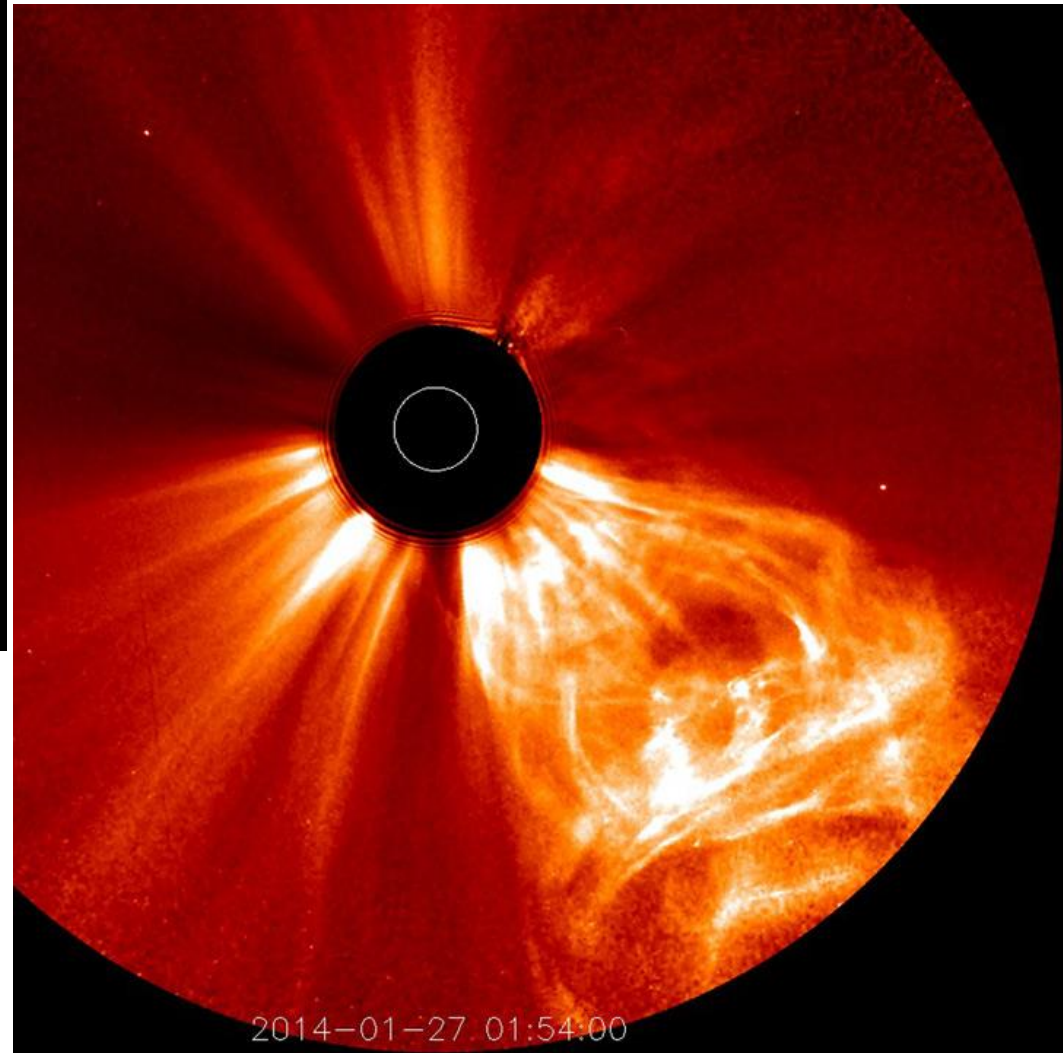
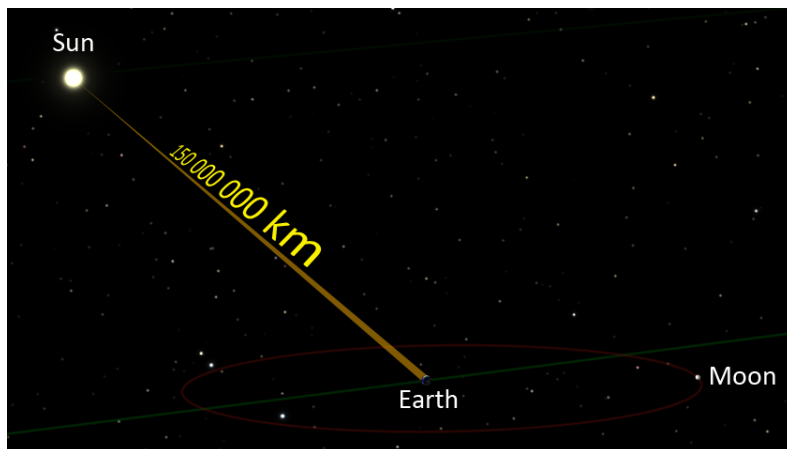
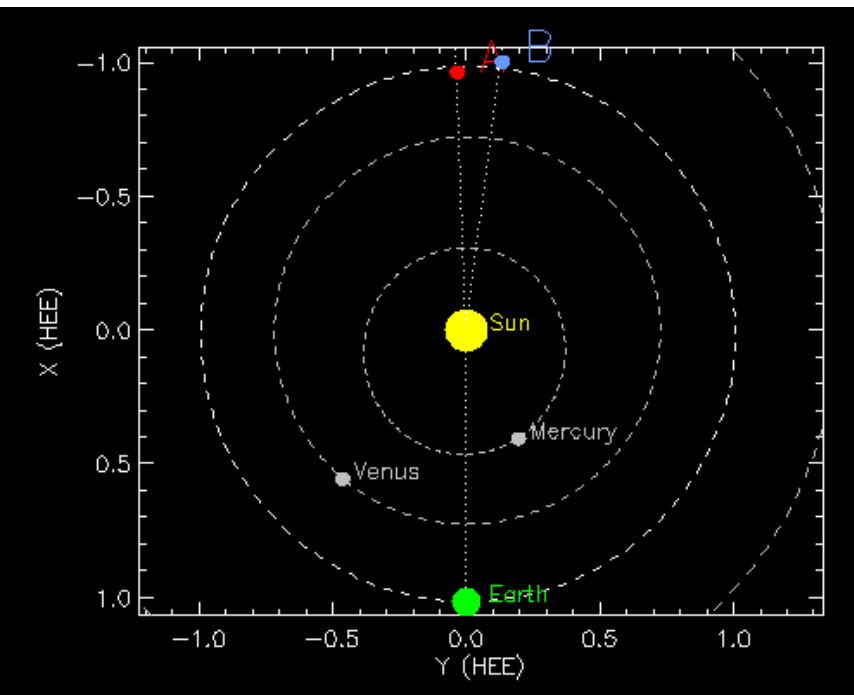
Soho



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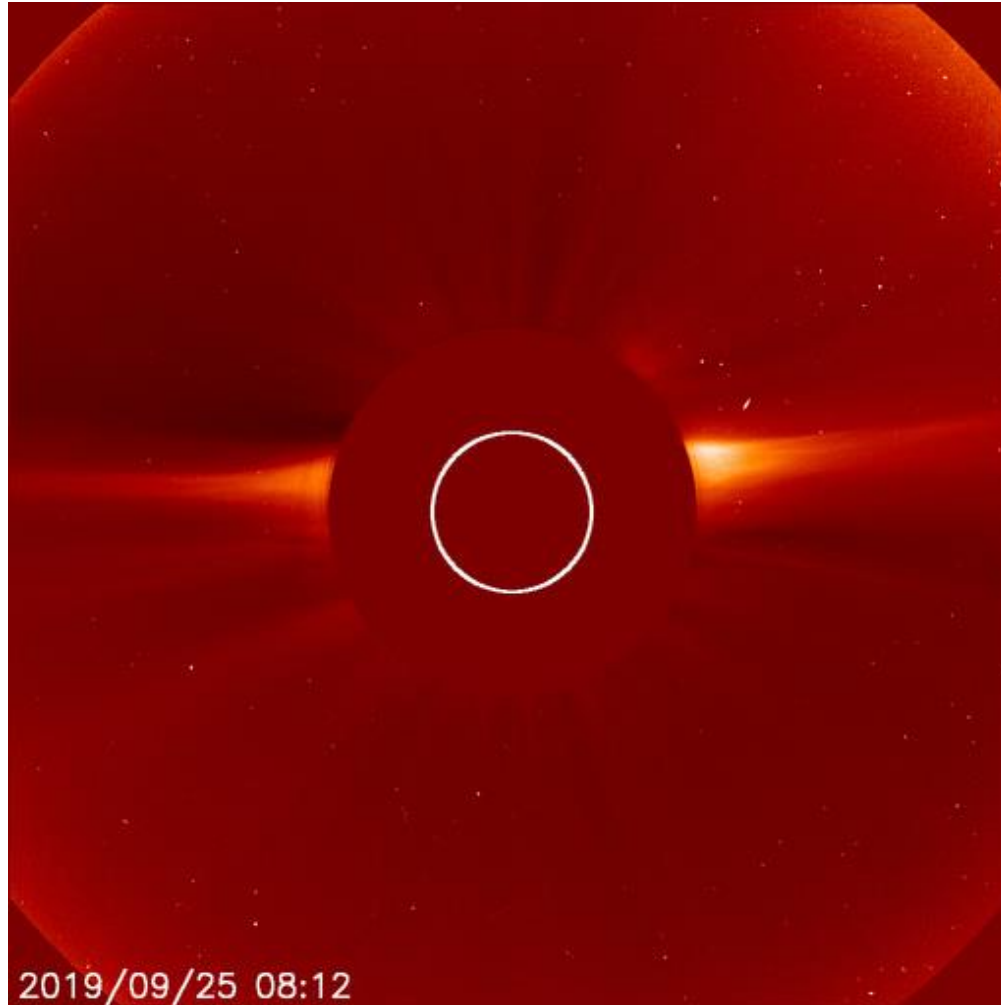
STEREO



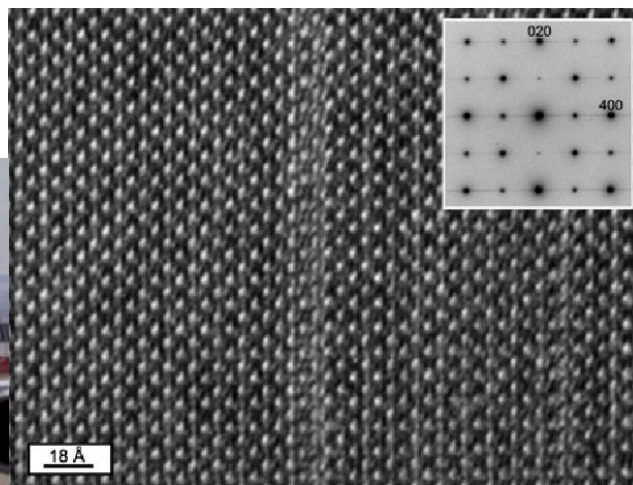
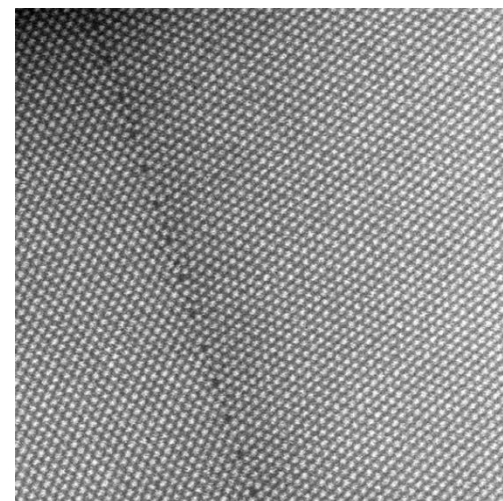
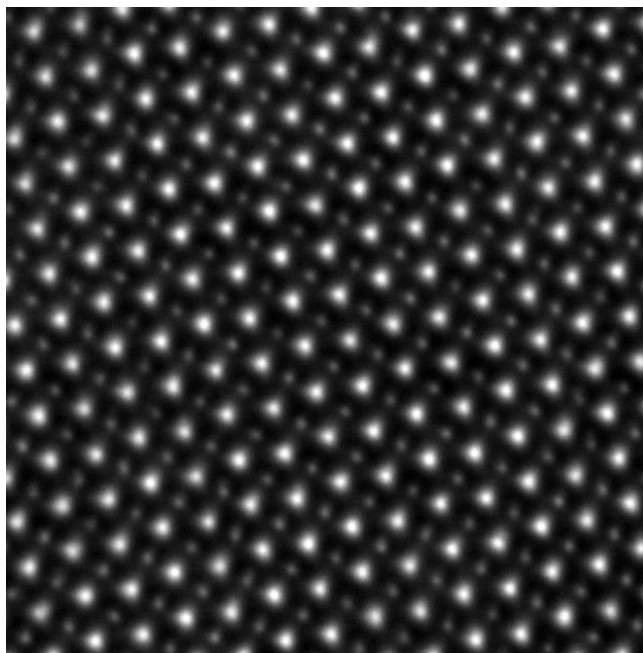


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Sun on Wednesday



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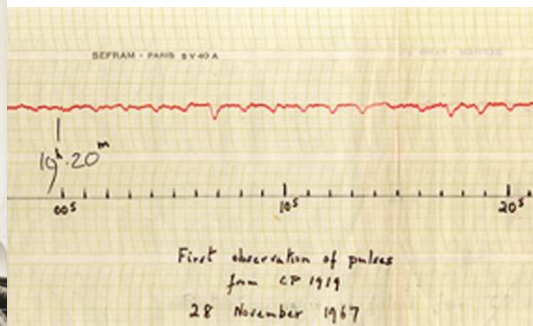


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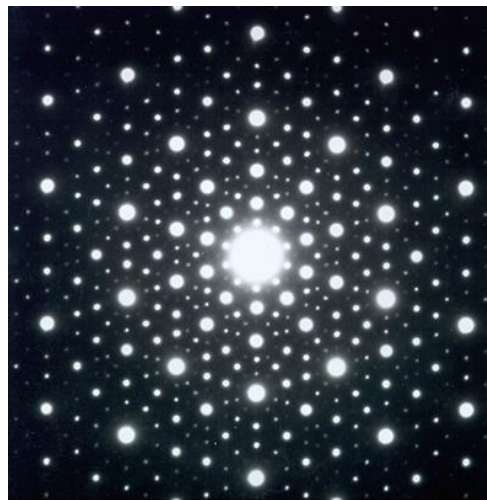
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Challenging accepted truth



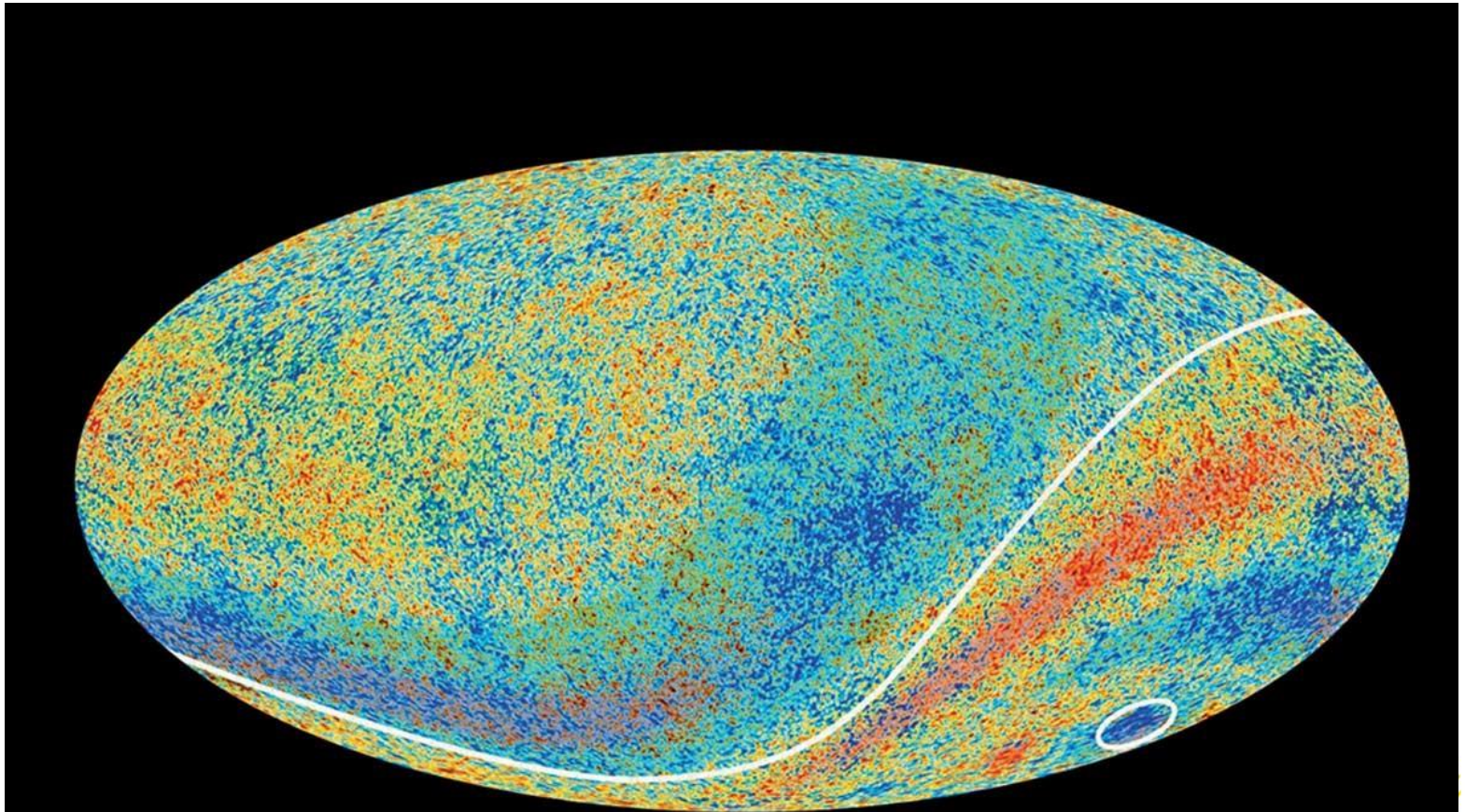
Pulsars

Quasicrystals





Cosmic Microwave Background, light from the edge of the universe – is it or is there a wormhole into another universe beyond the big bang?





Light from the early universe asks questions



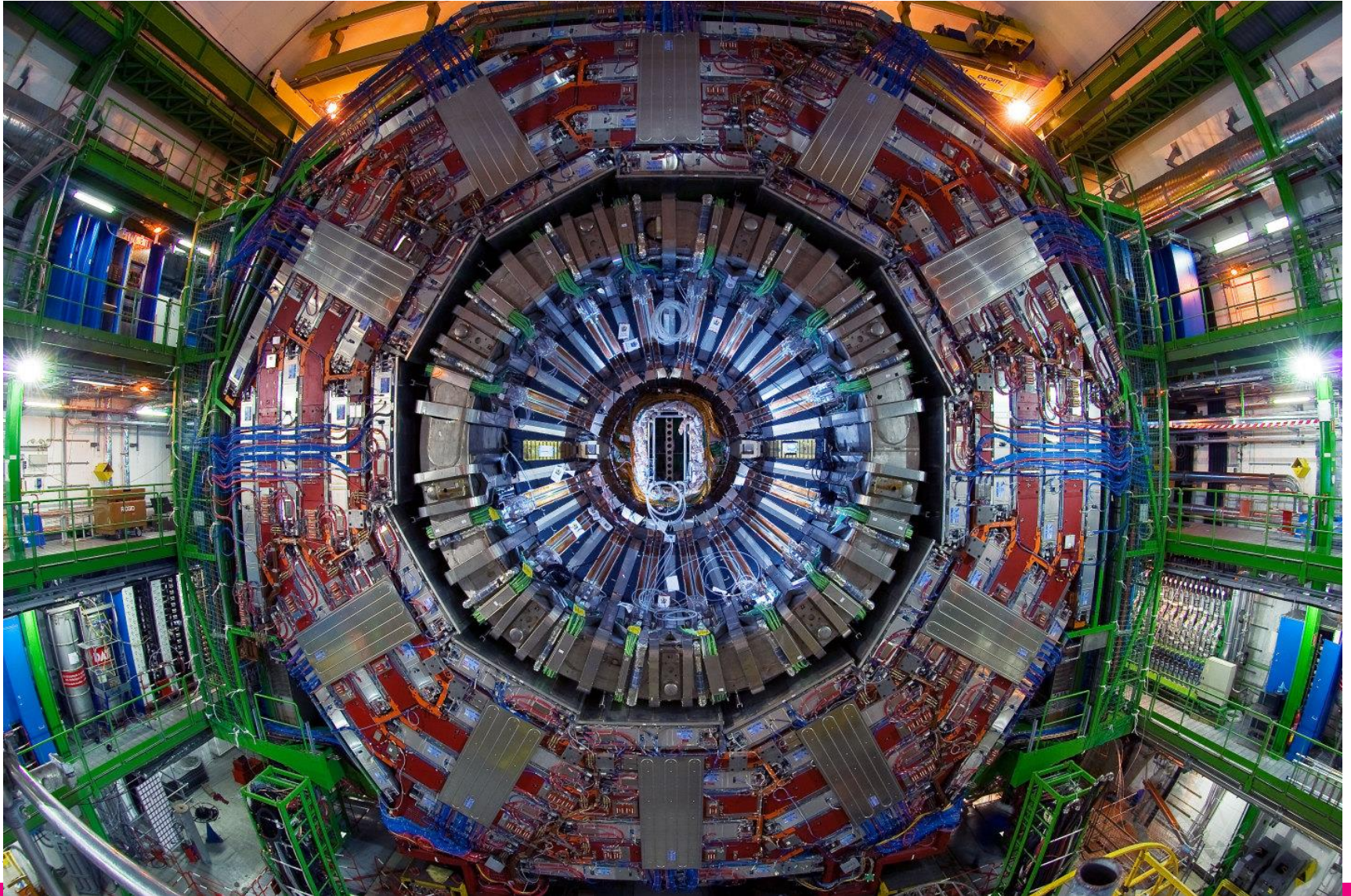
- Where did we all come from, our purpose?
 - Q. 1. *What is the chief end of man?*
 - A. Man's chief end is to glorify God, and to enjoy him forever.
- How can we enjoy the fullness of God when we see and understand so little?
- Is life on earth an accident or what is it to be created in the image of God? Are we co-creators or merely reflectors?
- If the universe is not going for the big crunch how do we view end times? Are our images of last things blinded by our inability to see? (Tony Thiselton in his book "The Last Things" **talks about the need for models, metaphors for "Things not seen."**)
- The nature of the "eternal present, I am" within space-time continuum





CMS Compact Muon Solenoid

Count the number of floors





Sir Peter Higgs





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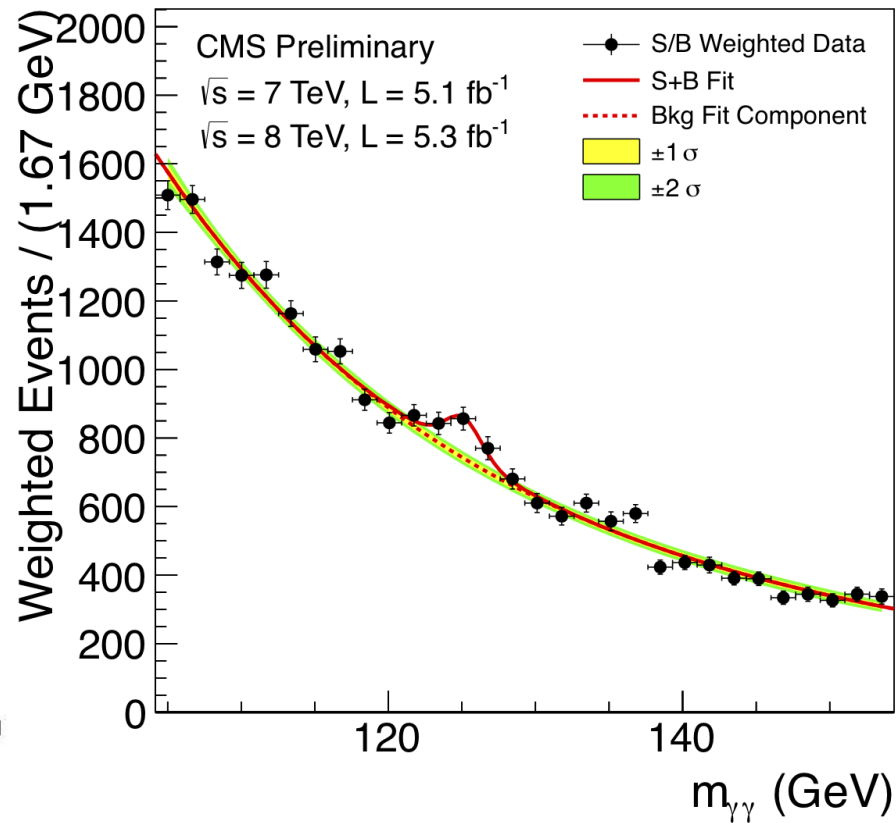
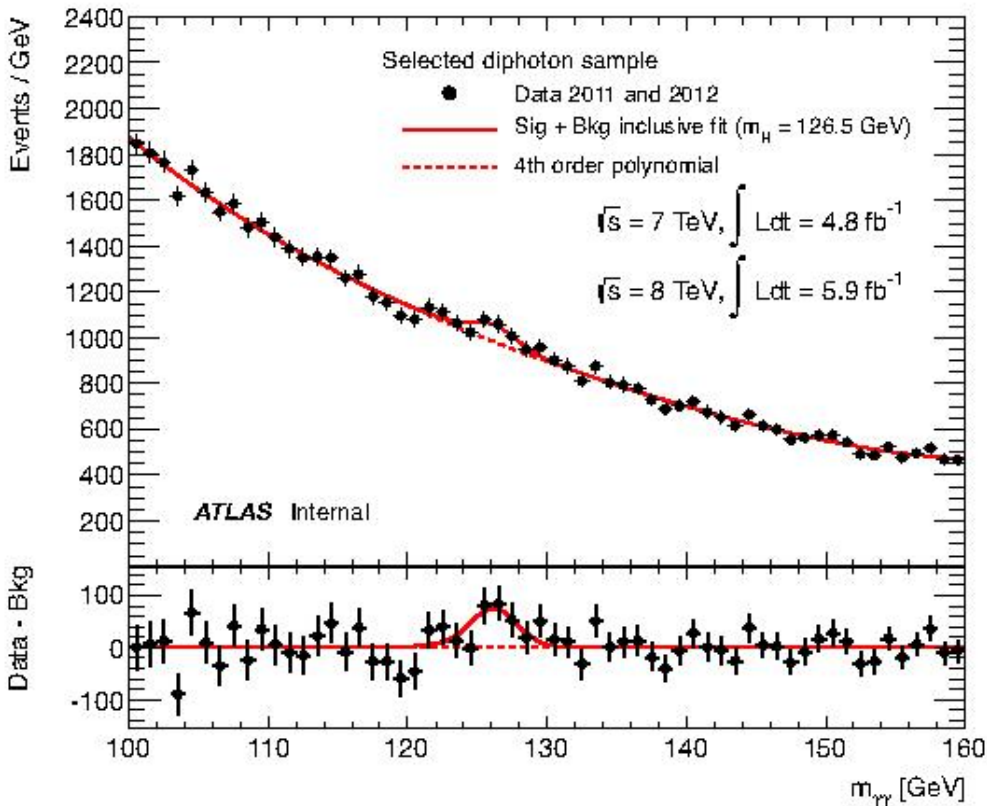
Peter Higgs is not the only one to visit



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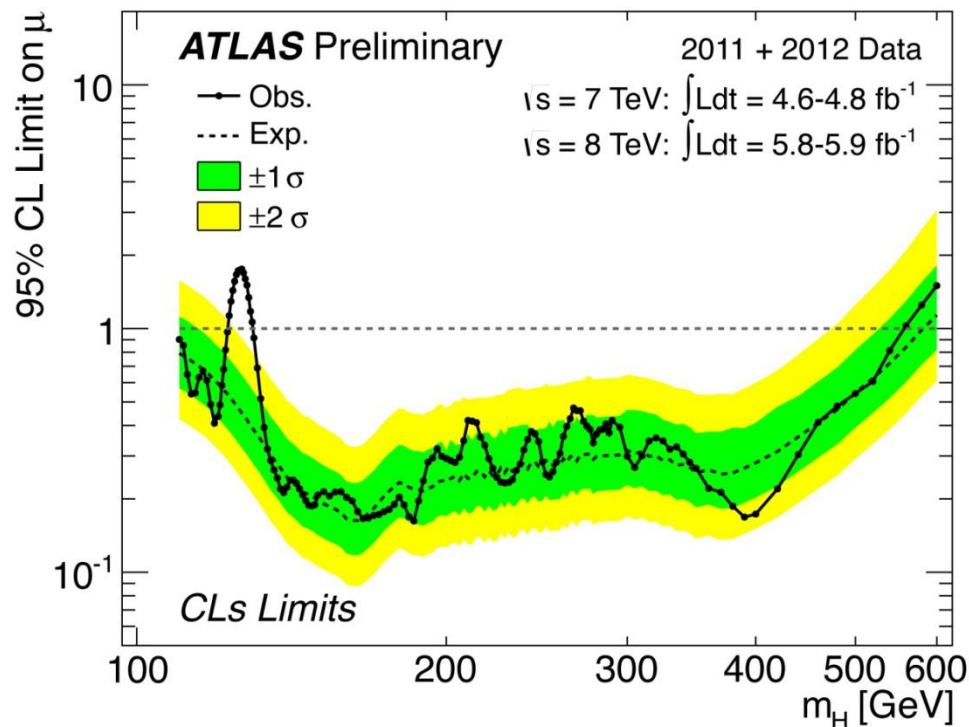
The evidence!

Do you believe it?



Yes

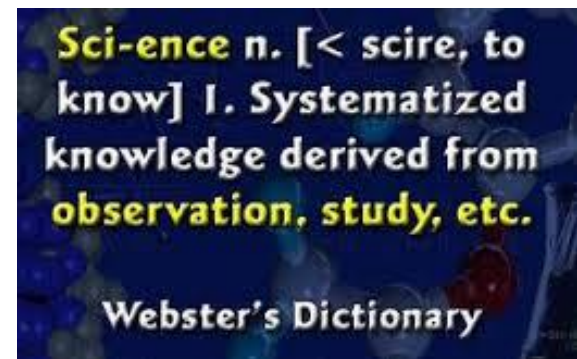
99.999% certain



All change but back to the past

Open Science/Science 2.0

- A systemic change in the modus operandi of science and research
- Affecting the whole research and innovation cycle and its stakeholders including the public





What is Open Science?

Open Science represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools. The idea captures a systemic change to the way science and research have been carried out for the last fifty years: shifting from the standard practices of publishing research results in scientific publications towards sharing and using all available knowledge at an earlier stage in the research process.



It's real!

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Figshare.com

Sci-starter.com

Runmycode.org

An emerging ecosystem of services and standards

my experiment

Myexperiment.org

Open workflows

Data-intensive

Citizens' science

Open code

Pre-print

arXiv.org

ArXiv

Roar.eprints.org

Open access

Impact Story

Alternative Reputation systems

Altmetric.com



Mendeley.com

Collaborative bibliographies

Academia.edu



Scientific blogs

Researchgate.com

ResearchGate

Open data

Datadryad.org

Open annotation

Openannotation.org

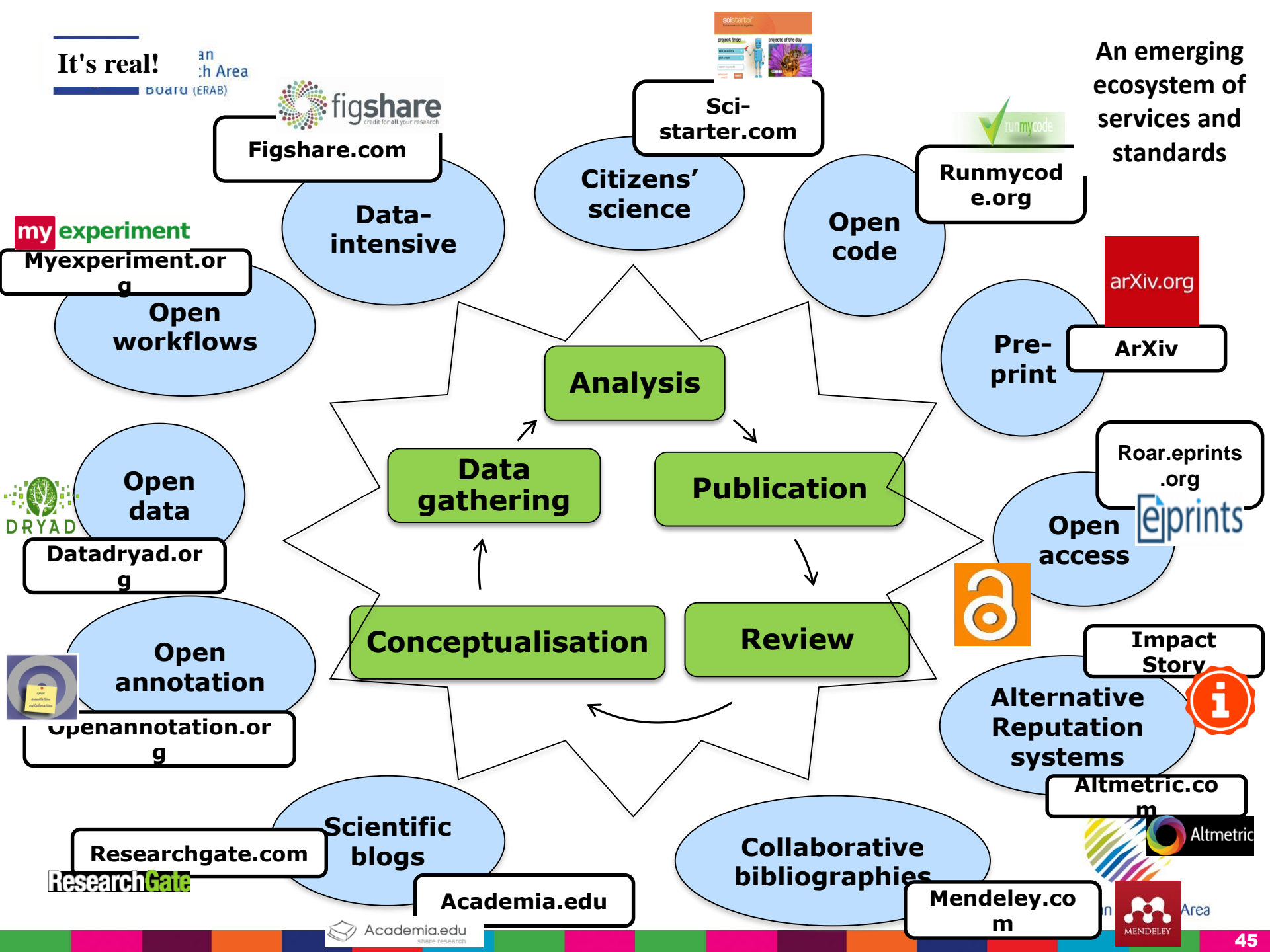
Analysis

Data gathering

Publication

Conceptualisation

Review





e-Science and the Fourth Paradigm

Thousand years ago – **Experimental Science**

Description of natural phenomena

Last few hundred years – **Theoretical Science**

Newton's Laws, Maxwell's Equations...

Last few decades – **Computational Science** -

Simulation of complex phenomena

Today – **Data-Intensive Science**

Scientists overwhelmed with data sets

from many different sources

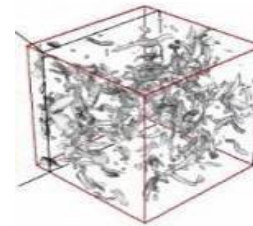
- Data captured by instruments
- Data generated by simulations
- Data generated by sensor networks

e-Science is the set of tools and technologies to support data federation and collaboration

- For analysis and data mining
- For data visualization and exploration
- For scholarly communication and dissemination



$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - K\frac{c^2}{a^2}$$



(With thanks to Jim Gray)

OSPP current areas of work

- **Prioritised recommendations for the eight ambitions of Open Science**
- Below are a set of actionable recommendations from the OSPP to be taken as the next step towards the longer-term vision articulated by Open Science consultations and expert groups set up by the EC and other organisations in Europe and worldwide. The recommendations have been split up into the eight priorities identified from the 5 areas of the European Open Science Agenda, namely:
 - Rewards and Incentives
 - Research Indicators and Next-Generation Metrics
 - Future of Scholarly Communication
 - European Open Science Cloud
 - FAIR Data
 - Research Integrity
 - Skills and Education
 - Citizen Science



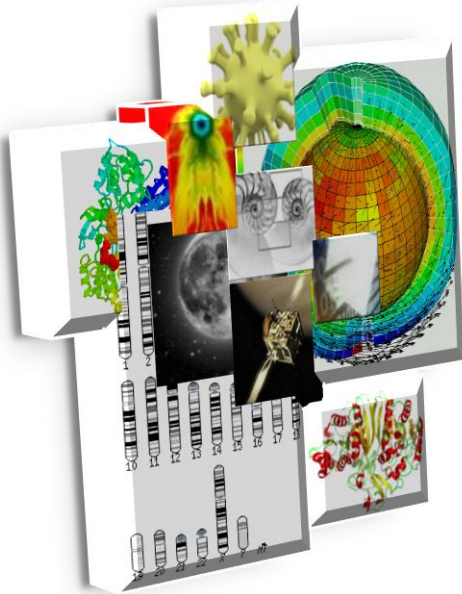
RIDING THE WAVE

**HOW EUROPE CAN GAIN FROM THE
RISING TIDE OF SCIENTIFIC DATA
A VISION FOR 2030**



European Research Area

Global collaboratories



- They can engage in whole new forms of scientific inquiry and treat information at a scale we are only beginning to see.
- ... and help us solving today's Grand Challenges such as climate change and energy supply.



Vision 2030

(6) The public has access and can make creative use of the huge amount of data available; it can also contribute to the data store and enrich it. All can be adequately educated and prepared to benefit from this abundance of information.

- ☐ Embed data science in **all training and academic qualifications**.
- ☐ Integrate into gaming and social networks

IMPACT IF ACHIEVED

- ☐ Citizens get a better awareness of and confidence in sciences, and can play an active role in evidence based decision making and can question statements made in the media.





GO FAIR is a bottom-up, stakeholder-driven and self-governed initiative that aims to implement the FAIR data principles, making data Findable, Accessible, Interoperable and Reusable. It offers an open and inclusive ecosystem for individuals, institutions and organisations working together through Implementation Networks (INs). The INs are active in three activity pillars: GO CHANGE, GO TRAIN and GO BUILD.





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ERA 2030: ERAB's STRATEGIC VIEW

October 2009



European Research Area

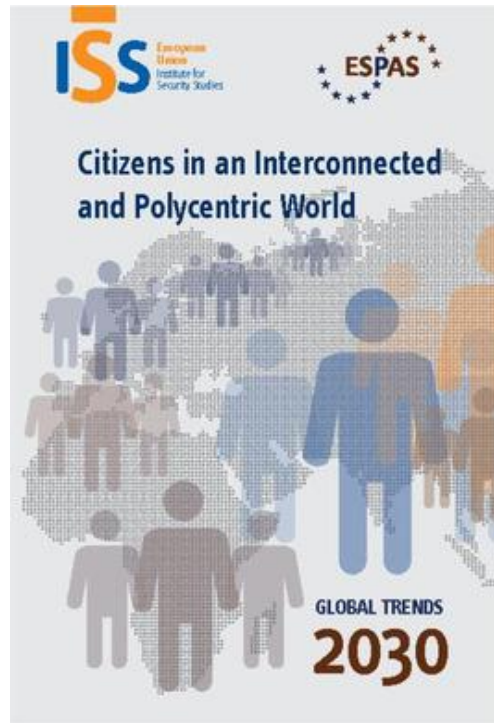
Developing a Renaissance mind



... **holistic thinking** and approach epitomized the first '**Renaissance**', where **scholars and artists** moved relatively freely around Europe among the centres of learning and culture. While this privilege was the domain of a few at that time, it should be our ambition, in the new '**Renaissance**', that this should be the expectation of all citizens, especially in the field of research and innovation.

Bringing different disciplines together to focus on the big picture to solve societal challenges inspired by working together under charismatic leadership





“Knowledge is no longer concentrated in the hands of a few; it can be created and shared by ordinary citizens everywhere, challenging the very legitimacy of traditional sites of knowledge and information production such as universities and the media.”





Plan S

**Making full and
immediate Open
Access a reality**

Principles and Implementation

Part I: The Plan S Principles

"With effect from 2021, all scholarly publications on the results from research funded by public or private grants provided by national, regional and international research councils and funding bodies, must be published in Open Access Journals, on Open Access Platforms, or made immediately available through Open Access Repositories without embargo."





Big issues facing Universities and Public at Large

- Open Access to both publications and data “all publicly funded research must be publicly available”
- Who is providing the data, can it be trusted?
- How do I know the provenance – has it been corrupted?
- Is it accessible, what type of metadata is there?
- Personal and persistent identifiers, a loss of personal freedom or a passport to participate?
- IPR and legal position
- Personal health data – how can this be handled?
- How to teach and research in this global environment?
- Where do the high priests of science sit?



Citizen Cyber Lab and the SDGs



THE CHALLENGE

In September 2015, world leaders committed to achieve [17 Global Goals](#) for Sustainable Development (also known as Sustainable Development Goals or SDGs) during the next 15 years. The Global Goals address a range of challenges to a sustainable future on this planet, including poverty, gender inequality, disease, climate change, and social injustice.

How can you help ensure that the goals will be achieved?

One way is to use open data to verify progress towards the goals at a local, regional, or global level. Such tracking can be done with the help of "crowdsourcing", which accelerates the analysis of large amounts of data, such as images or documents, thanks to collective efforts on the internet.

We are asking you to pitch a project that tackles Global Goals using open data.

The Open Seventeen Challenge aims to transform grassroots enthusiasm on the Web into new open knowledge that can help governments, the private sector, and civil society organizations achieve the Global Goals by the year 2030.

All you need to do is find a data set, define your crowdsourcing goal and [pitch your idea](#).

The Open Seventeen Challenge is a joint initiative of the research organizations [Citizen CyberLab](#) and [GovLab](#), [The ONE Campaign](#), and the open-source company [SciFabric](#)





European
Research Area
Board (ERA)

Old Weather

Help scientists recover Arctic and worldwide weather observations recorded in ship's logs since the mid-19th century.

Choose a project and get started:

Old Weather: Whaling

Explore the Arctic of the past from the deck of a whaling ship

Old Weather: Arctic

Rediscover the historic Arctic voyages of the U.S. Navy and Coast Guard

Why Scientists Need You

In this video scientists explain why your contributions are vital, and what they're doing with your results behind the scenes.



European Research Area

Shakespeare's World

Transcribe handwritten documents by Shakespeare's contemporaries and help us understand his life and times. Along the way you'll find words that have yet to be recorded in the authoritative Oxford English Dictionary, and which will eventually be added to this important resource.

Get started



European Research Area

CITIZEN SCIENCE AT UNIVERSITIES: TRENDS, GUIDELINES AND RECOMMENDATIONS



LERU recommendations

Recommendations for institutions

For universities, the recommendations are to:

1. Recognise citizen science as an evolving set of research methods, as well as its societal and educational benefits;
2. Consider creating, where viable, a single point of contact for citizen science within the institution, to advise scientists and ensure liaison with national and regional citizen science initiatives;
3. Raise awareness amongst researchers of criteria for successful citizen science, including community management, pedagogical practices, open science standards and social, intergenerational and gender diversity policies issues.
4. Ensure that proposals to granting bodies for citizen science projects include long-term commitment for infrastructures and data repositories, in line with other research projects with long-term scientific or societal benefits;
5. Ensure that project participants comply with ethical, legal and privacy regulations relevant to the scope of a given citizen science project, and have access to professional advice for this purpose;
6. Adapt research evaluation and reputation systems to include metrics that can characterise projects with a high societal impact, such as successful citizen science projects, and develop ways of assessing citizen participation.



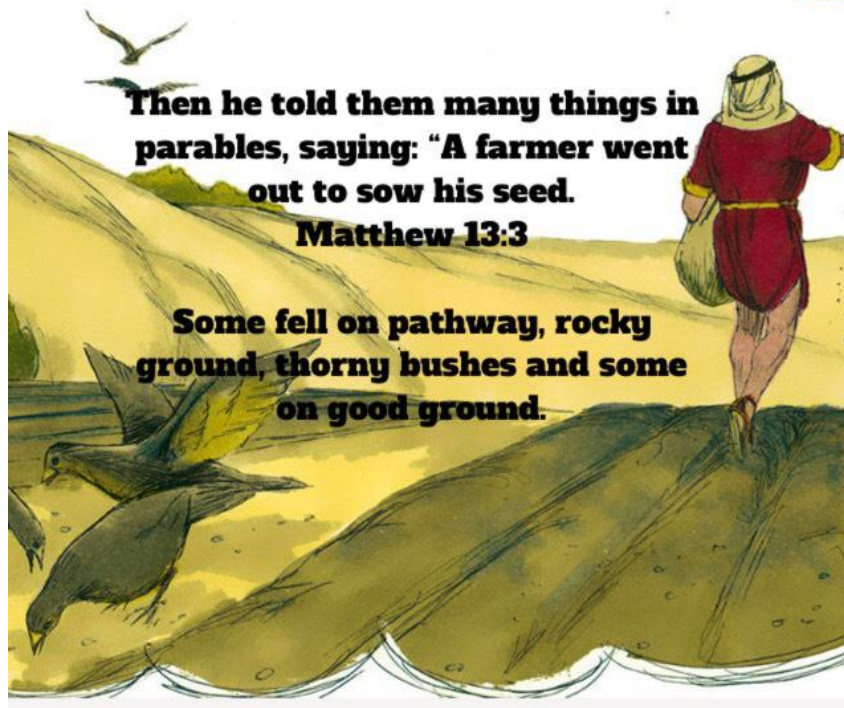
Fiction

- “It is precisely the daring work of fiction to probe beyond settled truth and to walk on the edge of alternatives not yet available to us. It is this probe behind our settlements that makes newness possible.” (Brueggemann)



Welcome to IdeaSquare,
a place where scientists and
society meet to push the
boundaries of knowledge
and to share and explore
new ways to reach societal
impact through research and
technology. A space designed
for collaboration through
curiosity, creativity and
science. A place where people
have a licence to dream.





“This is why I speak to them in parables: ‘Though seeing, they do not see; though hearing, they do not hear or understand.’ In them the prophecy of Isaiah is fulfilled: “You will be ever hearing but never understanding; you will be ever seeing but never perceiving.”



Taking responsibility as Christians in this evolving landscape – we follow a prophet, priest and king

You are the light of the world. A town built on a hill cannot be hidden.¹⁵ Neither do people light a lamp and put it under a bowl. Instead they put it on its stand, and it gives light to everyone in the house. ¹⁶ In the same way, let your light shine before others, that they may see your good deeds and glorify your Father in heaven.

