Physics & Society

The Scientific Method

- Who comprises of the physics community?
- How do people agree or disagree on research?
- What constitutes of the scientific method?

The Scientific Method

- Observation
- Question
- Research
- Hypothesis
- Experiment
- Analysis
- Conclusion

Knowledge

- Experiential
- Non-experiential

Research Repositories

There are many different repositories for physics research. Many of them are derived by the motivation for open science and are free to access, but many more are still behind the paywall. Famous ones include

- arXiv
- NASA ADS
- INSPIRE HEP
- and many not-so-free journals like Nature

Although not advised, many independent scientists resort to nonconventional sources to get to articles behind the wall.

Different Physics Communities..

- AIP - American Institute of Physics
- NSBP - National Society of Black Physicist
- APA - American Physical Society
- NSBE - National Society of Black Engineers
- EPSNA - Ethiopian Physics Society in North America
- RAS - Royal Astronomical Society
- EPS - Ethiopian Physics Society

And many, many more

Research can be serious, but also serious & funny

Non-Perturbative Simulations of Quantum Field Theories using Complex Langevin Dynamics

https://arxiv.org/abs/2309.03330

Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?

https://arxiv.org/pdf/1110.2832.pdf

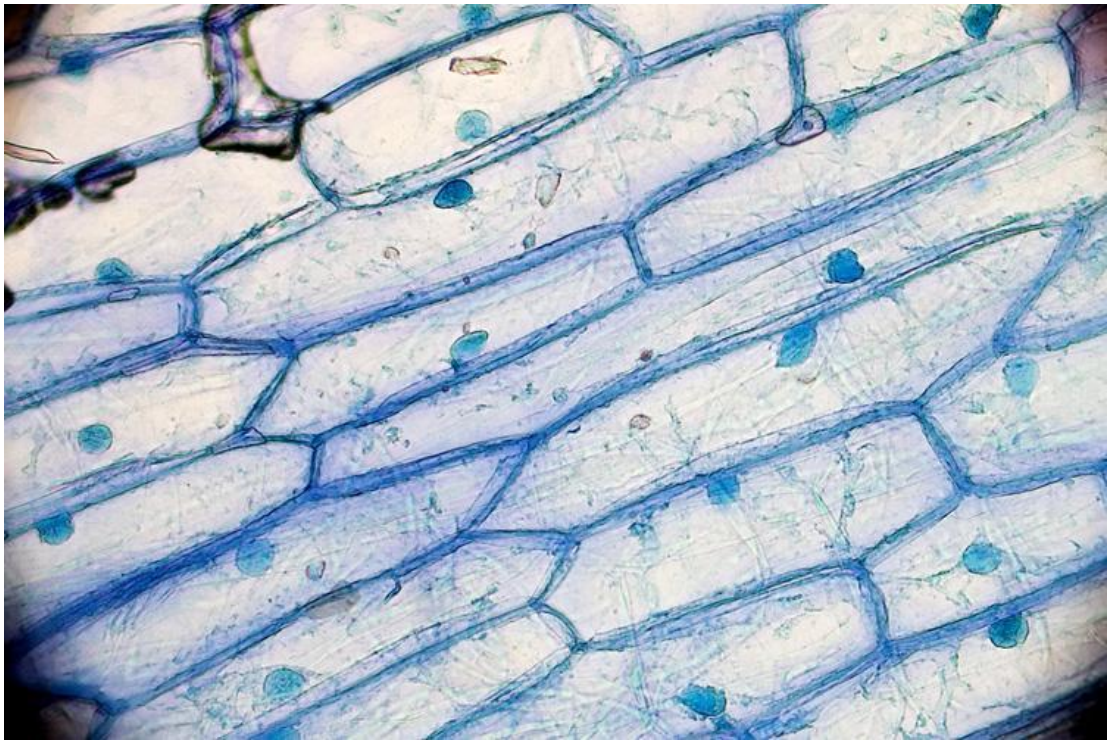
The Beauty of Physics

Galaxies are as immense as atoms are small. Yet the same laws of physics describe both, and all the rest of nature—an indication of the underlying unity in the universe. The laws of physics are surprisingly few in number, implying an underlying simplicity to nature's apparent complexity. (credit: NASA, JPL-Caltech, P. Barmby, Harvard Smithsonian Center for Astrophysics)

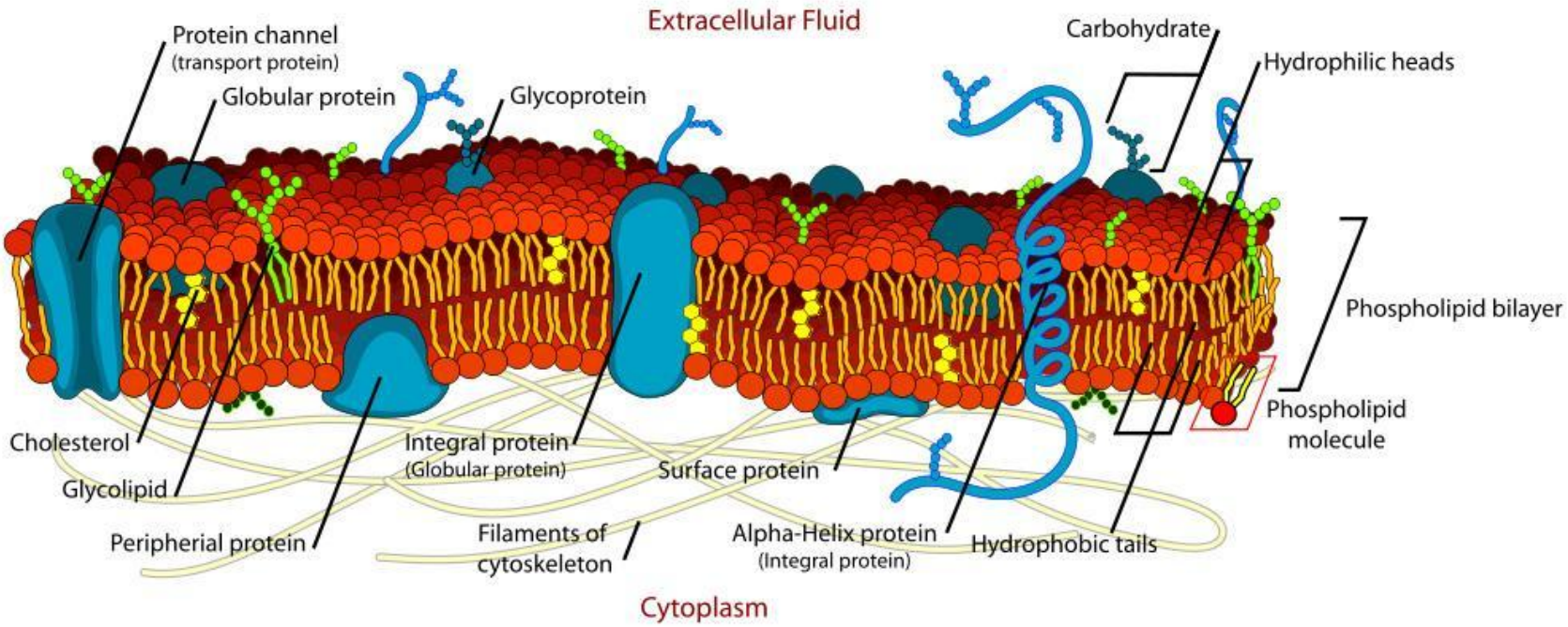
Even biology is governed by physics…

The flight formations of migratory birds such as Canada geese are governed by the laws of physics. (credit: David Merrett)

More biology…



Physics, chemistry, and biology help describe the properties of cell walls in plant cells, such as the onion cells seen here. (credit: Umberto Salvagnin)



An artist's rendition of the structure of a cell membrane. Membranes form the boundaries of animal cells and are complex in structure and function. Many of the most fundamental properties of life, such as the firing of nerve cells, are related to membranes. The disciplines of biology, chemistry, and physics all help us understand the membranes of animal cells. (credit: Mariana Ruiz)

No surpises here, physics rules again!

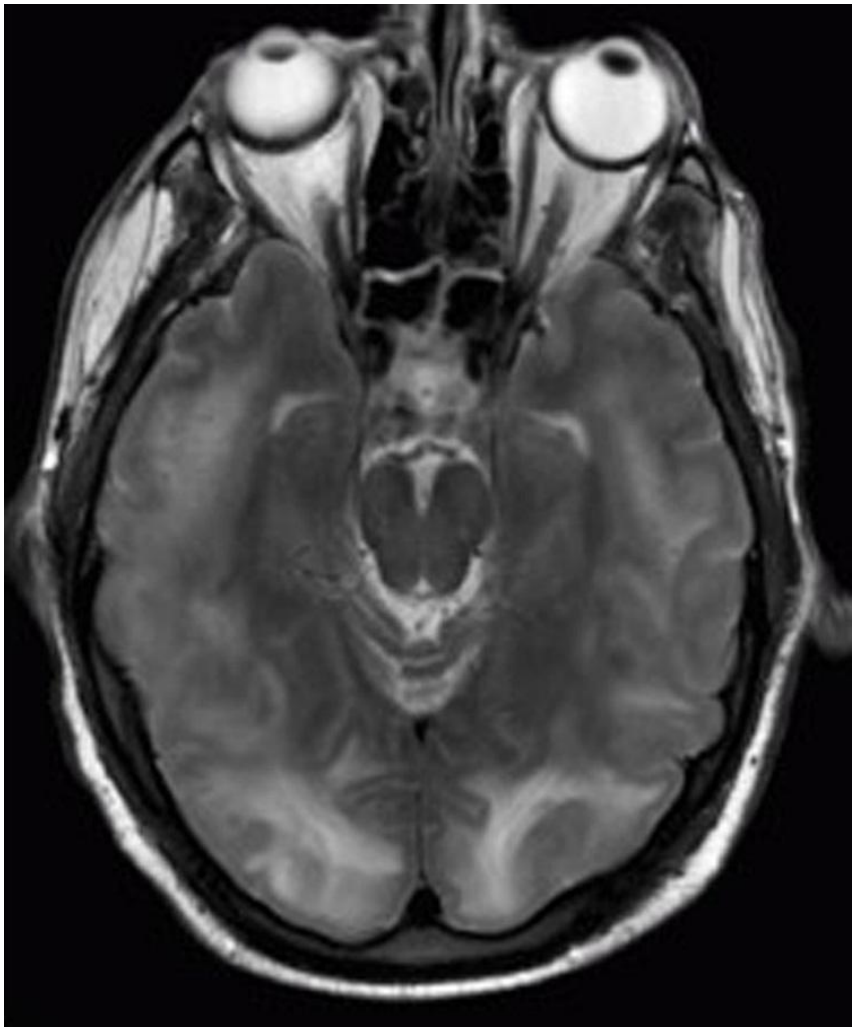
The Apple “iPhone” is a common smart phone with a GPS function. Physics describes the way that electricity flows through the circuits of this device. Engineers use their knowledge of physics to construct an iPhone with features that consumers will enjoy. One specific feature of an iPhone is the GPS function. GPS uses physics equations to determine the driving time between two locations on a map. (credit: @gletham GIS, Social, Mobile Tech Images)

Cooking & Physics...

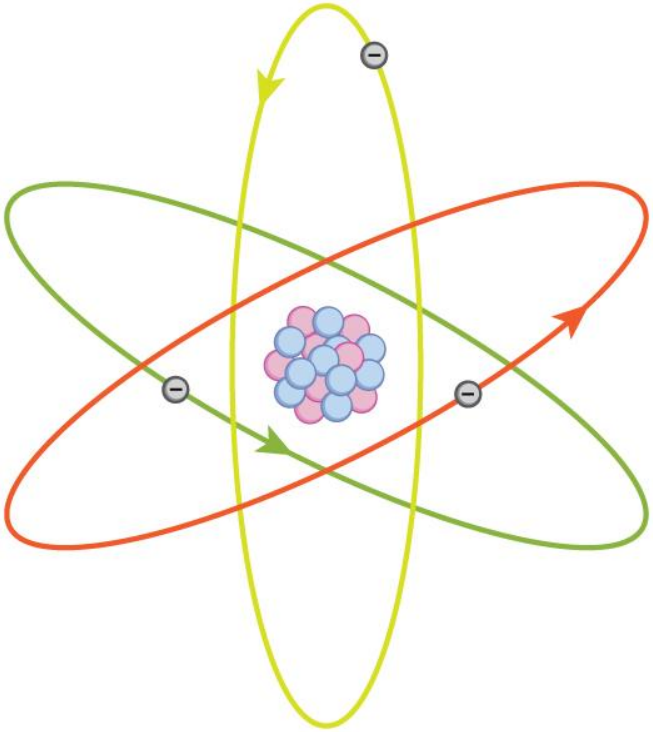
The laws of physics help us understand how common appliances work. For example, the laws of physics can help explain how microwave ovens heat up food, and they also help us understand why it is dangerous to place metal objects in a microwave oven. (credit: MoneyBlogNewz)

Health & Physics…. no surprises here

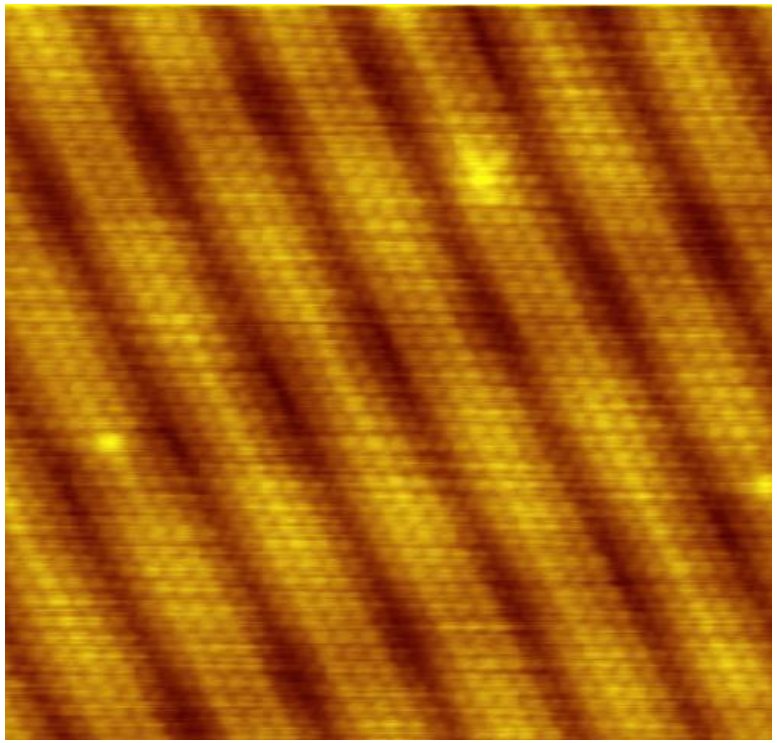
These two applications of physics have more in common than meets the eye. Microwave ovens use electromagnetic waves to heat food. Magnetic resonance imaging (MRI) also uses electromagnetic waves to yield an image of the brain, from which the exact location of tumors can be determined. (credit: Rashmi Chawla, Daniel Smith, and Paul E. Marik)



From the smallest scales ..

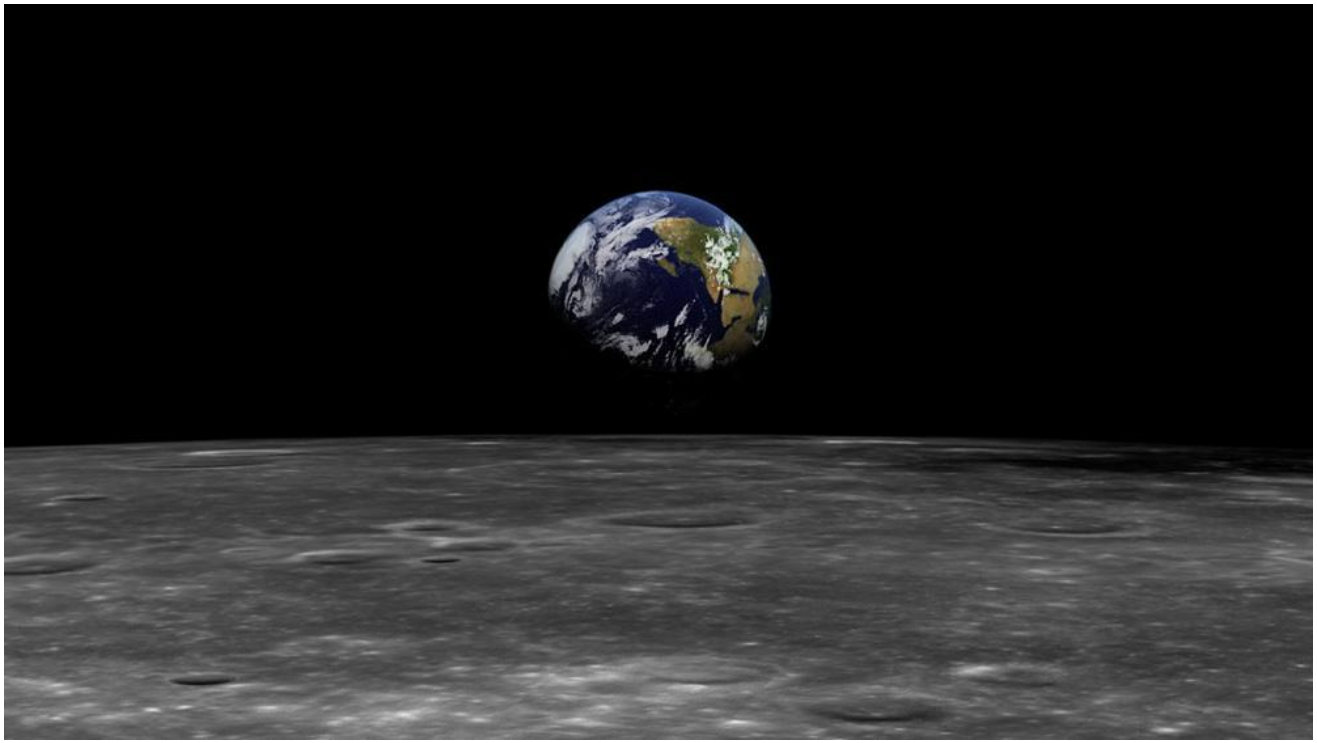


What is a model? This planetary model of the atom shows electrons orbiting the nucleus. It is a drawing that we use to form a mental image of the atom that we cannot see directly with our eyes because it is too small.



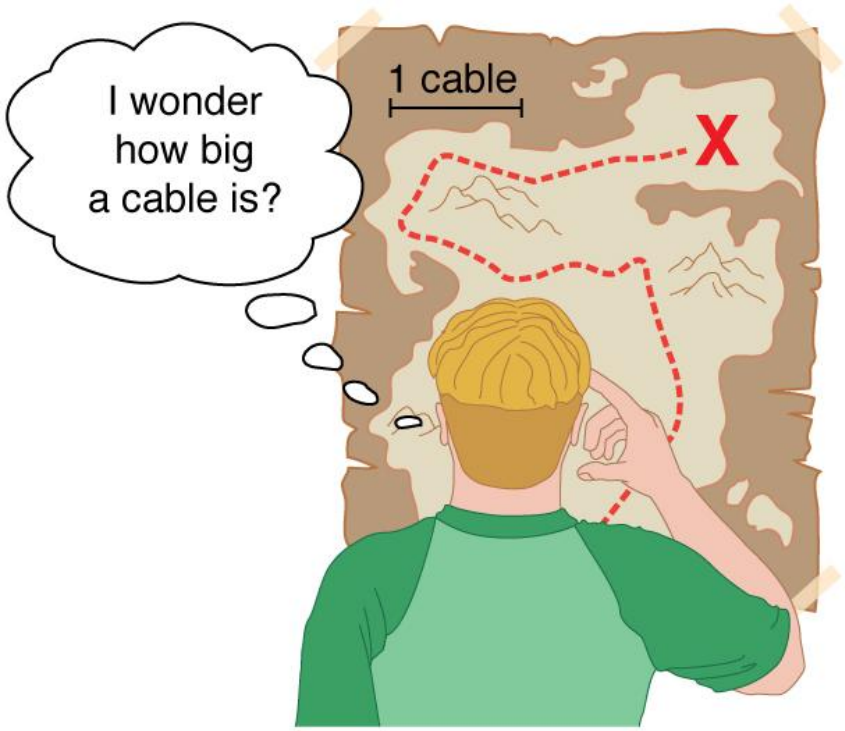
Using a scanning tunneling microscope (STM), scientists can see the individual atoms that compose this sheet of gold. (credit: Erwinrossen)

… to the biggest



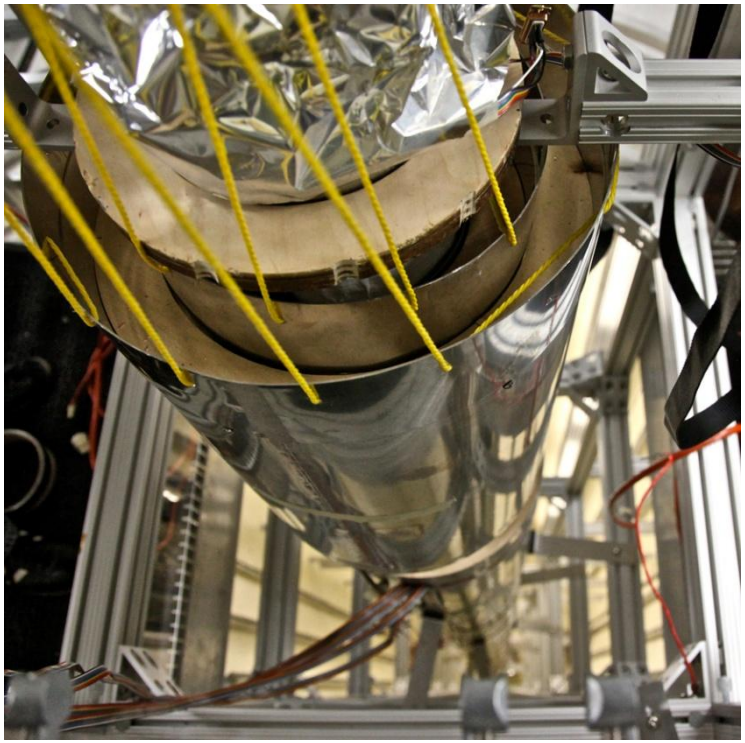
The distance from Earth to the Moon may seem immense, but it is just a tiny fraction of the distances from Earth to other celestial bodies. (credit: NASA)

Defining measurements & counting



Distances given in unknown units are maddeningly useless.

and defining time itself



An atomic clock such as this one uses the vibrations of cesium atoms to keep time to a precision of better than a microsecond per year. The fundamental unit of time, the second, is based on such clocks. This image is looking down from the top of an atomic fountain nearly 30 feet tall! (credit: Steve Jurvetson/Flickr)

Careers in Physics

You can work in multiple lines of work with a background in physics(https://www.csus.edu/college/natural-sciences-mathematics/physics-astronomy/_internal/docs/career_opportunities.pdf)

- Space Physics
- Medicine
- Geophysics
- Finance(... I know..)
- Consultancy
- Military
- Engineering
- Semiconductors
- Cosmology
- Technology & Software
- Computational disciplines