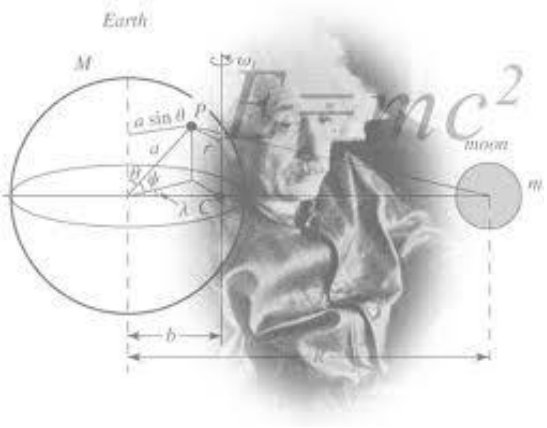
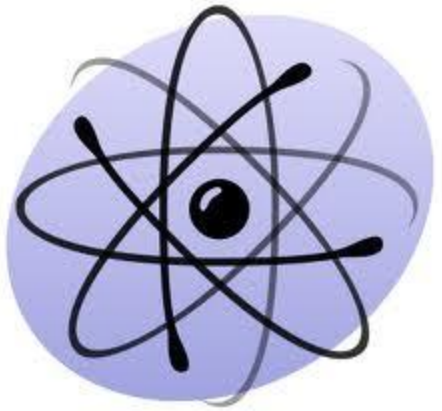




Physics and Engineering

The Impact on our World

The Past and Future of Physics

Dr. Ugur GUVEN

Aerospace Engineer (P.hD)

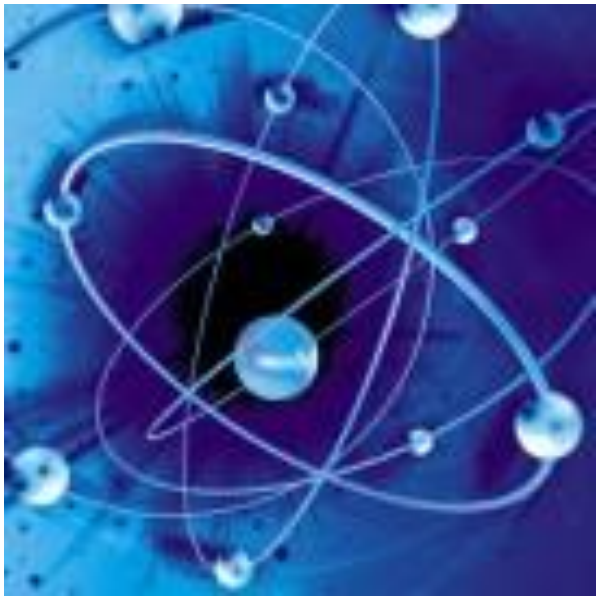
Nuclear Science and Technology Engineer (M.Sc)

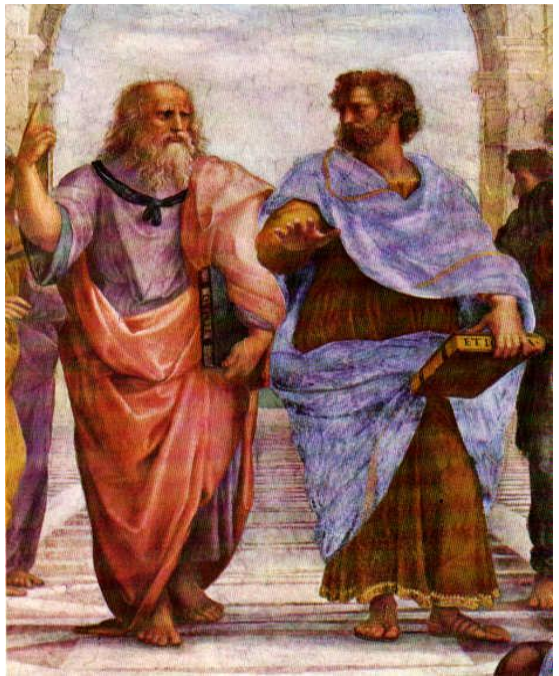
Physics is the Language of the Universe

- Using Physics, you can explain everything that has happened in the universe.
- Every single event that takes place follows a set pattern of rules which can be observed and calculated using physics principles

Physics and Greek

- The importance of physics was first understood by Greek. The first principles of Physics was demonstrated by Aristotle. The word physics means nature in Greek
- Aristotle believed that every knowledge relied on observation and that Earth was the center of the universe. Democratius found the indivisible atom





Physics and Sumerians

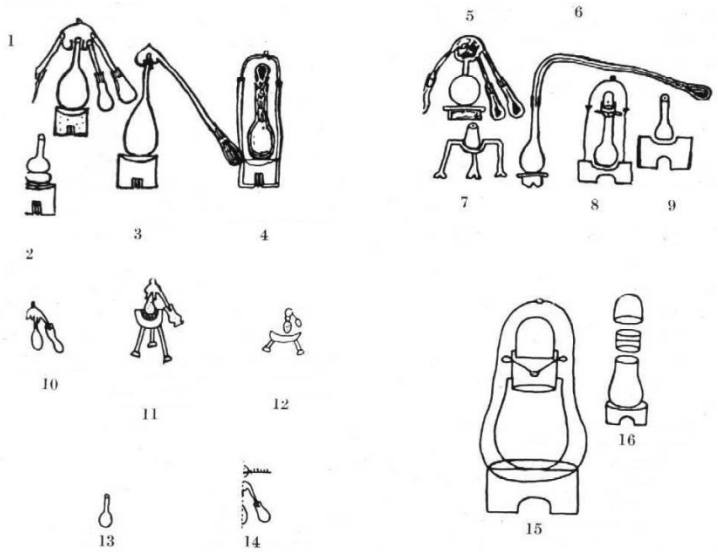
- Although most don't realize it, Sumerians utilized physics extensively to create a powerful civilization.
- They invented writing (Cuneiform)
- They manipulated the 60 base math system along with music to create a Theory of the universe and they correctly predicted the motion of planets at 3500 BC. Each God and planet was assigned a musical tone

Physics and the Egyptians

- Egyptians were one of the civilizations that were the manipulators of physics. The feat that they have accomplished in Pyramids is a testament to this fact.

Physics and Alchemy

- Physics was thought to be the same thing as alchemy for many decades even centuries.
- Alchemy is the concept of transforming raw materials to change into gold. Many important physicists worked on alchemistry.



Physics and Newton

- Isaac Newton is seen as the biggest scientist up to date. He has invented new concepts more then any other scientist up to date including Albert Einstein.

Physics and Renaissance

- Physics became the cornerstone of science in the time of Renaissance. Very famous physicists like Leonardo Da Vinci, Johannes Kepler, Tycho Brahe, Galileo Galilei etc.

Physics and Inventions

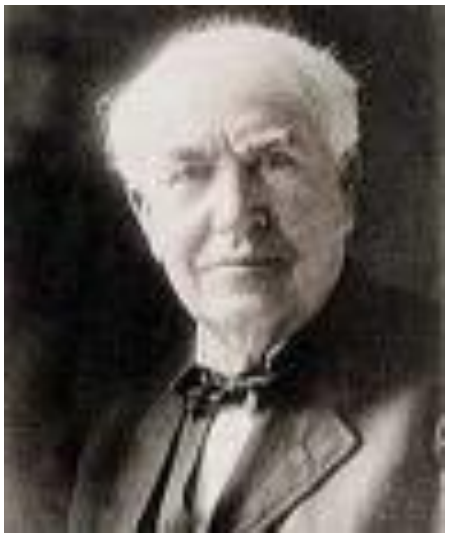
- Physics was used extensively by inventors all across the world. This was the first time the trends in physics was used for technological innovations that were intended for the masses

Physics and Electromagnetism

- One of the greatest milestones in physics was the discovery of the laws of Electromagnetism. This was achieved by the world famous physicist James Clerk Maxwell.
- Stephen Hawking described Maxwell as one of the last wizards of the world.

Physics and Electricity

- One of the biggest inventions in the world is the invention of the light bulb. This way, it became possible to harness the power of electricity for lighting. This eventually led to DC equipment.

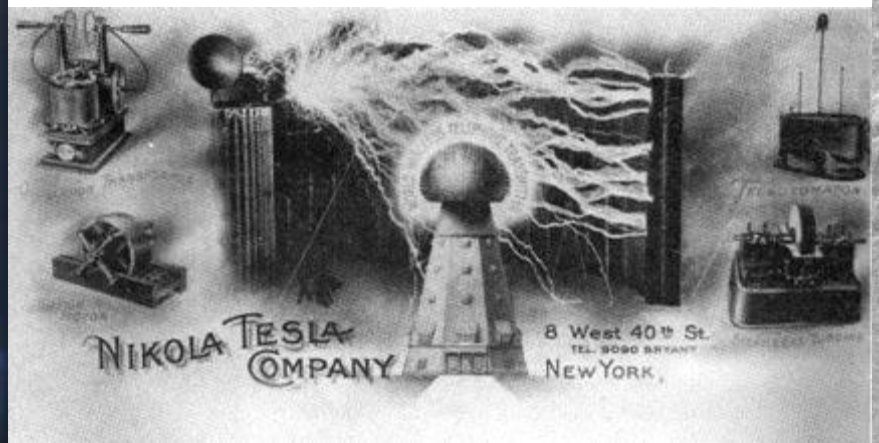


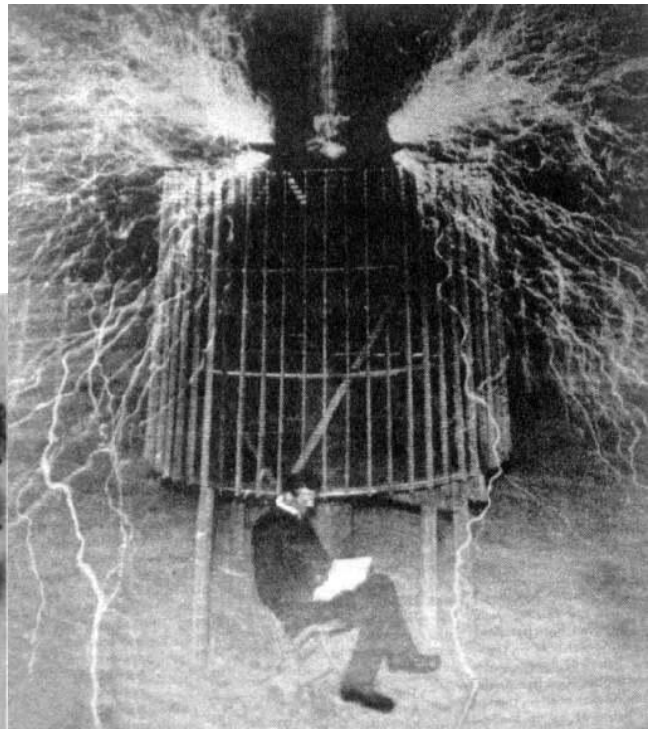
Physics and Telephone

- Physics was fundamental in telephonic communication. Graham Bell used the power of the electromagnetic theory for creating the telephone in 1876.

Physics and Tesla

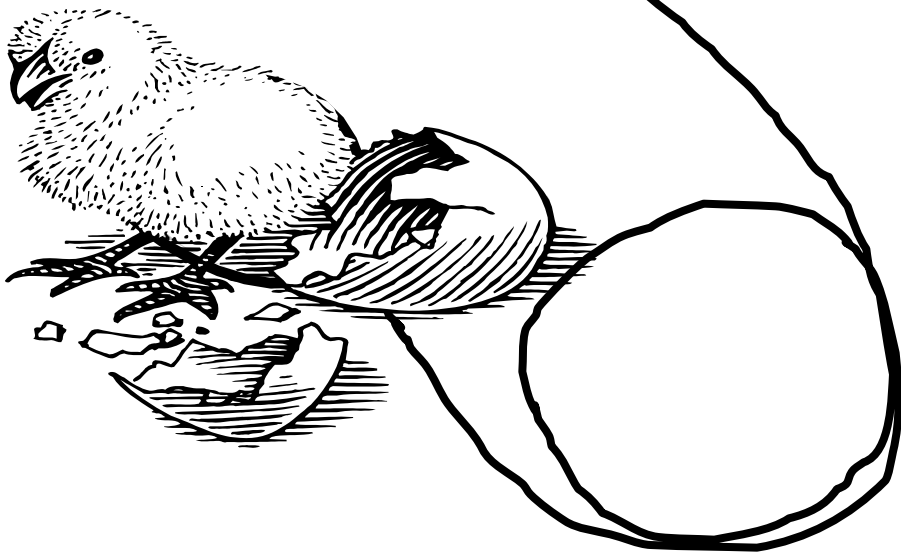
- Nicholas Tesla was a very controversial physicist who invented the radio. However, he also worked on the Tesla device which supposedly created energy out of nothing. He was able to light lamps from a distance and he also invented AC.





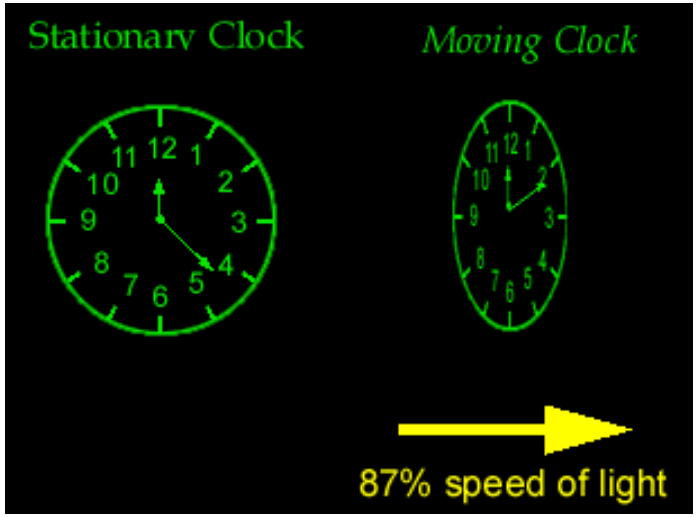
"Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world!"

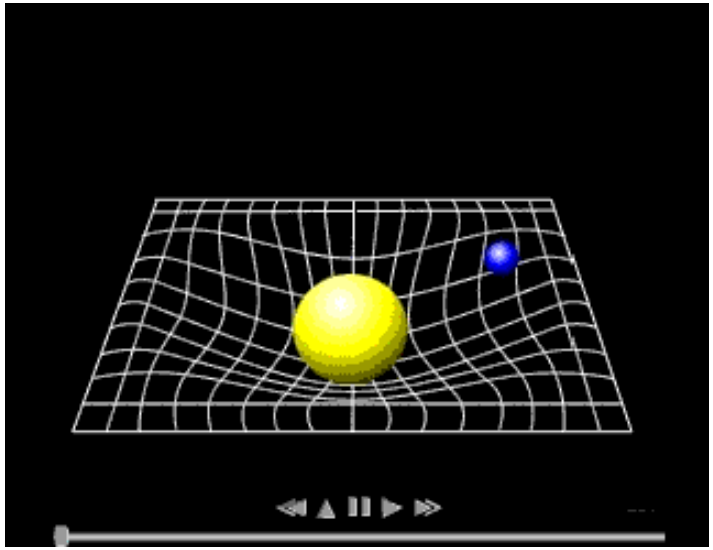
Albert Einstein, 1879-1955



Physics and Relativity

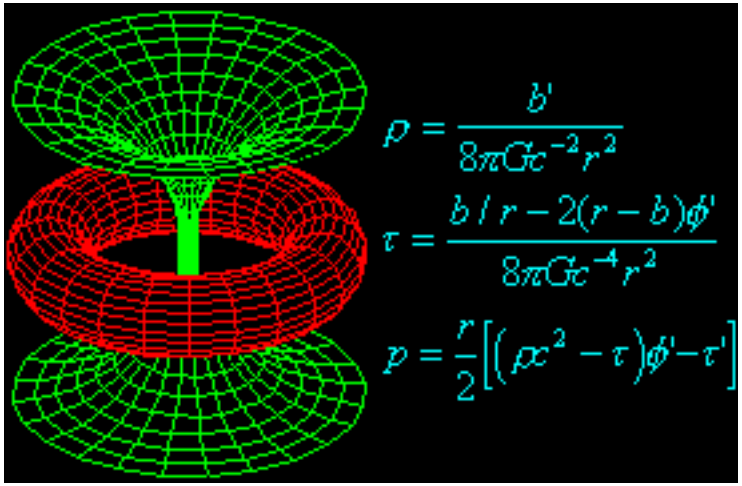
- After Einstein, the way that we observed the universe changed for good. With Einstein:
- The faster an object moves, faster its time will also tick
- Gravitational force will bend everything in its path
- Nothing can go faster then speed of light
- Space time is connected with each other

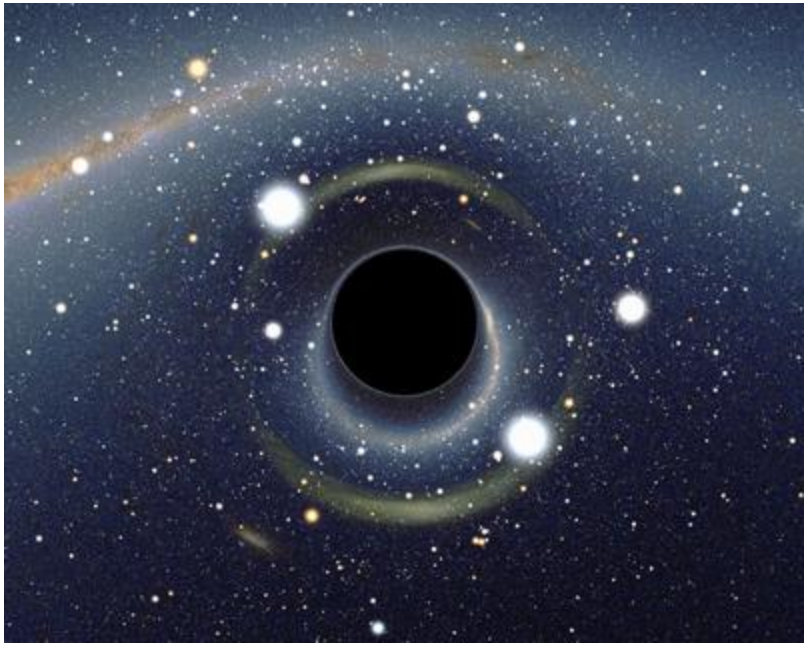




Physics and Cosmology

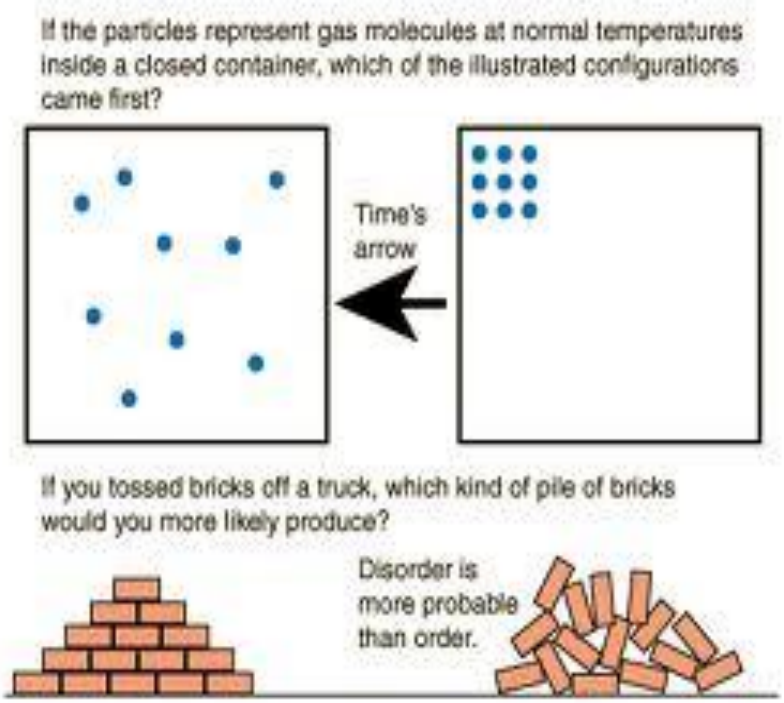
- Through the efforts of physicists such as Einstein, Schwarzchild, Chandresekhar, Wheeler, Zeldovich , Misner and Thorne tremendous knowledge about cosmology and black holes were found

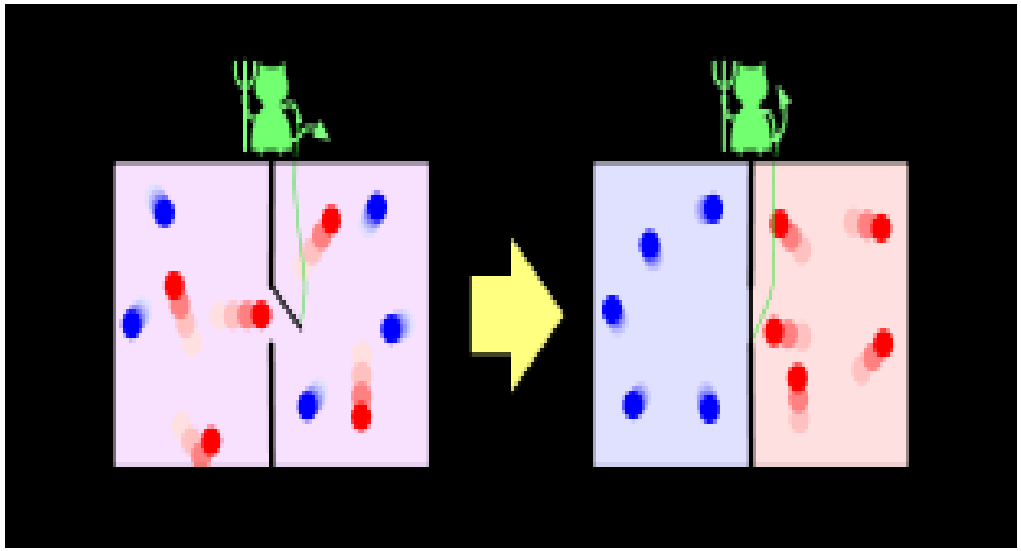




Physics and Entropy

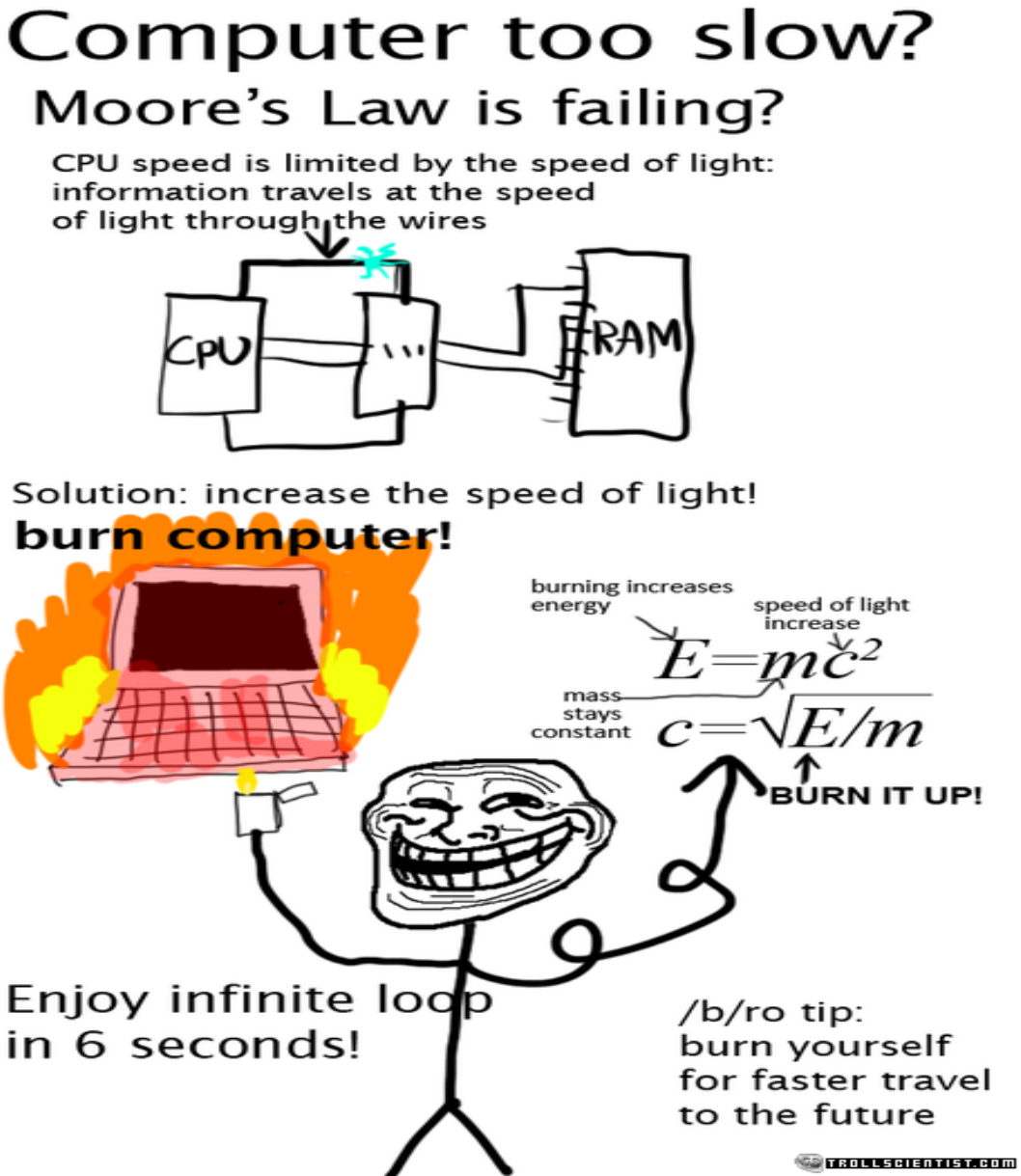
- Physics has led to thermodynamics which analyzes heat and entropy.
- Laws of Thermodynamics states that entropy in the universe will always grow.
- Maxwell's Demon tried to extract work by bypassing entropy to create a perpetual motion machine





Physics and Computers

- The advent of the computers and the internet has changed our lives for good.
- However, neither the internet nor computers would have existed if it wasn't for physics
- It was a physicist Charles Babbage that invented the first computer

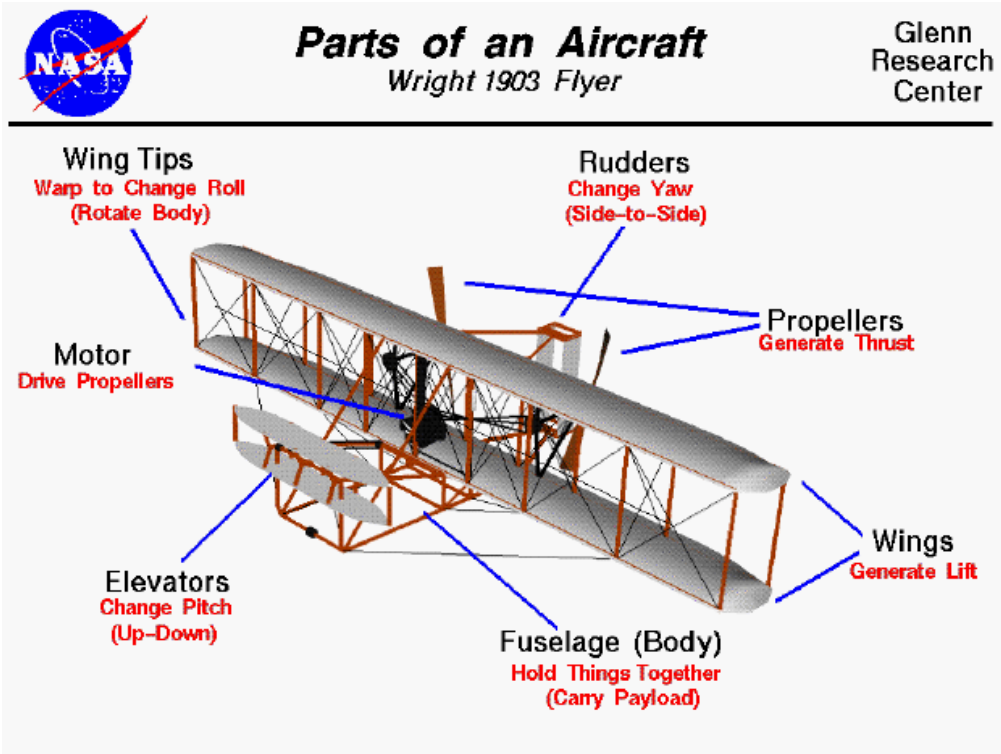


Physics and Internet

- It was Tim Berners Lee , a physicist working in CERN, who invented the concept of HTML and using WebPages to browse the net in 1990
- The workings of the internet depend completely on Physics and EM Laws

Physics in Aerospace

- The aerospace technology that we enjoy today could not have been possible without the understanding of physics. Nowadays, it is possible to fly in air through these principles.

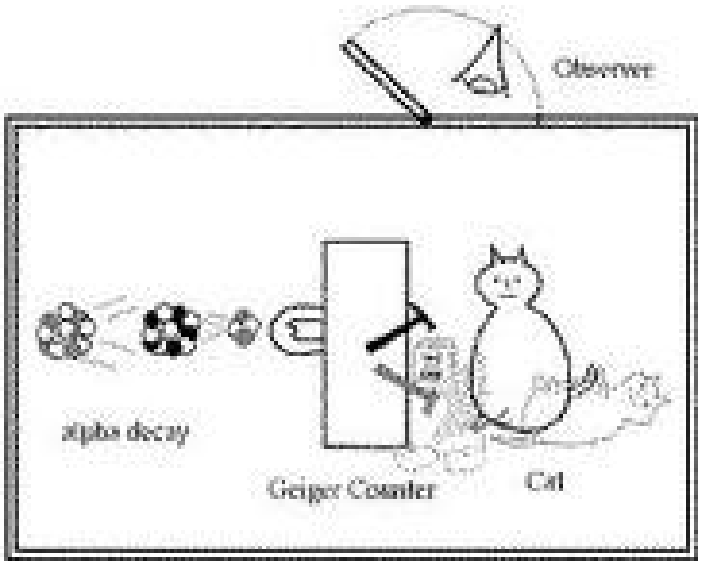


Physics and Nuclear Energy

- Physics has allowed mankind to harness the power of nuclear energy so that now we can have electricity produced cheaply and without the dependence on fossil fuels.
- Fermi was the first physicist to create a non stop nuclear chain reaction in 1941.

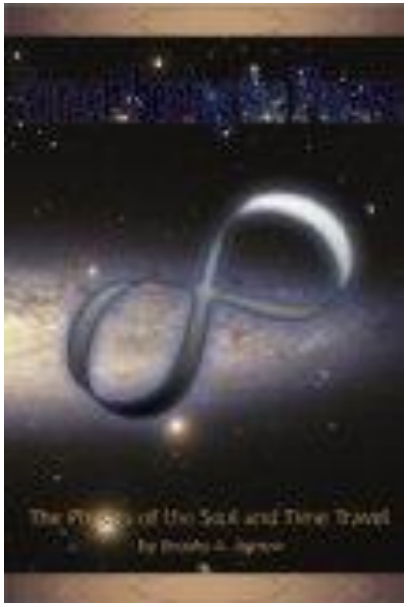
Physics and Schrodinger's Cat

- Schrodinger's cat is an important tenet of quantum mechanics which is responsible for most modern inventions today.
- Schrodinger cat states that no event will become a reality until it is observed.



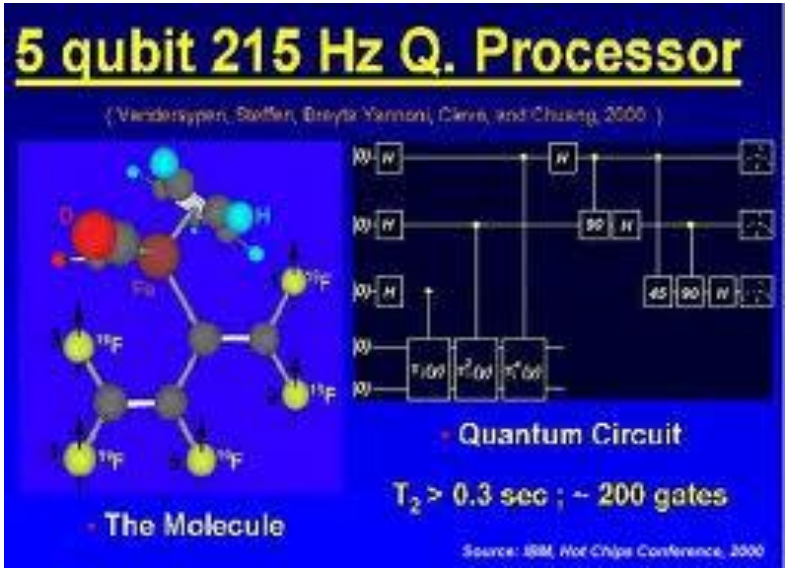
Physics for the Future

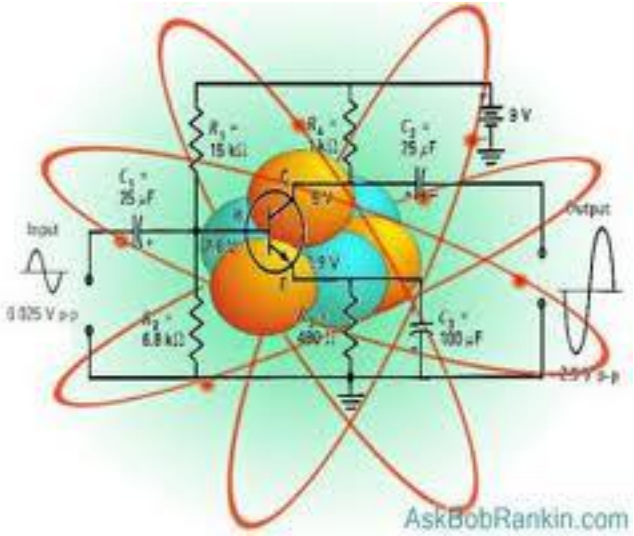
- Physics of the 21st century would focus on mind bending technologies that will change our lives forever.



Quantum Computers

- Quantum computers would be able to work at the speed of light. The calculations would allow for processes to be completed in less than microseconds with computers as small as molecules.
- IBM has currently the largest quantum computer in the world - a 5 bit computer in a single molecule. The molecule consists of five fluorine atoms, each representing a quantum bit, or 'qubit'.





Origins of the Universe

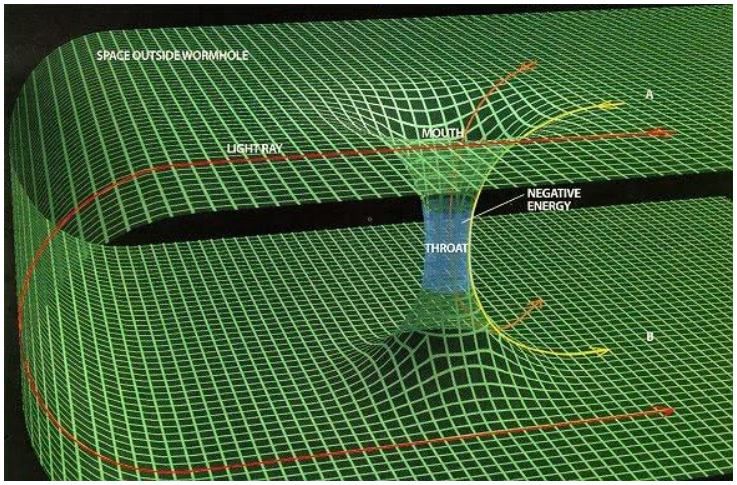
- Brilliant physicists in CERN are using a hadron collider to understand the energies that were inherent in the Big Bang.

Beaming and Transportation

- Physicists at Stanford university are constantly working on ways to make the future become a reality. One hot topic is beaming an object from one location to another.
- Two concepts are popular: Dirac jump as well as quantum pairs

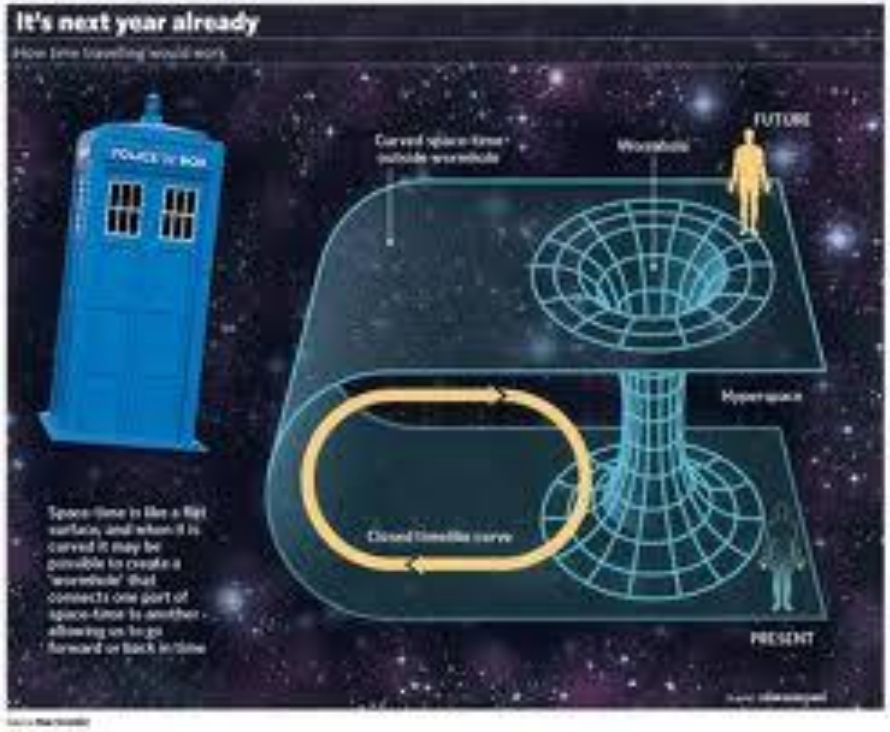
Warps and Wormholes

- Einstein describes the existence of black holes and worm holes which opens new possibilities
- Miguel Alcubierre, an astrophysicist, proposed a method of manipulating space in a way which would contract the fabric of space-time ahead of a spacecraft and expand it behind. The ship would ride inside a region of flat space called a "warp bubble" but not move within its boundaries



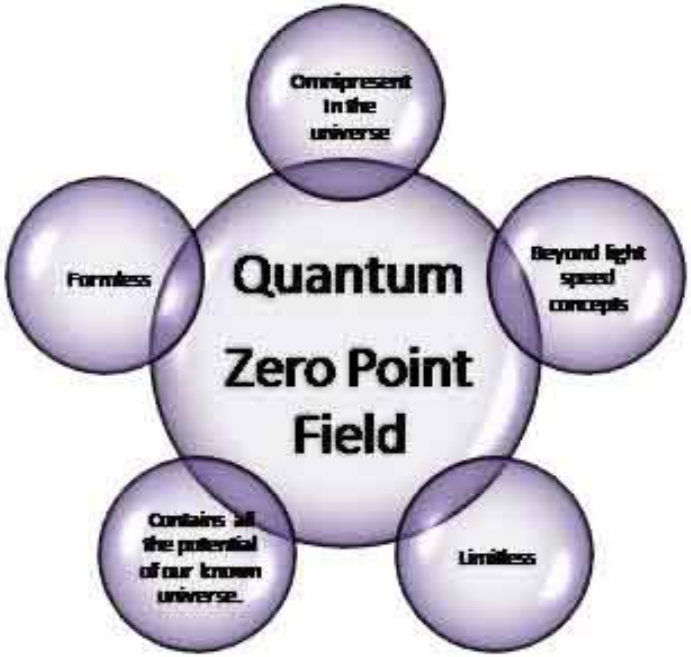
Physics and Time Travel

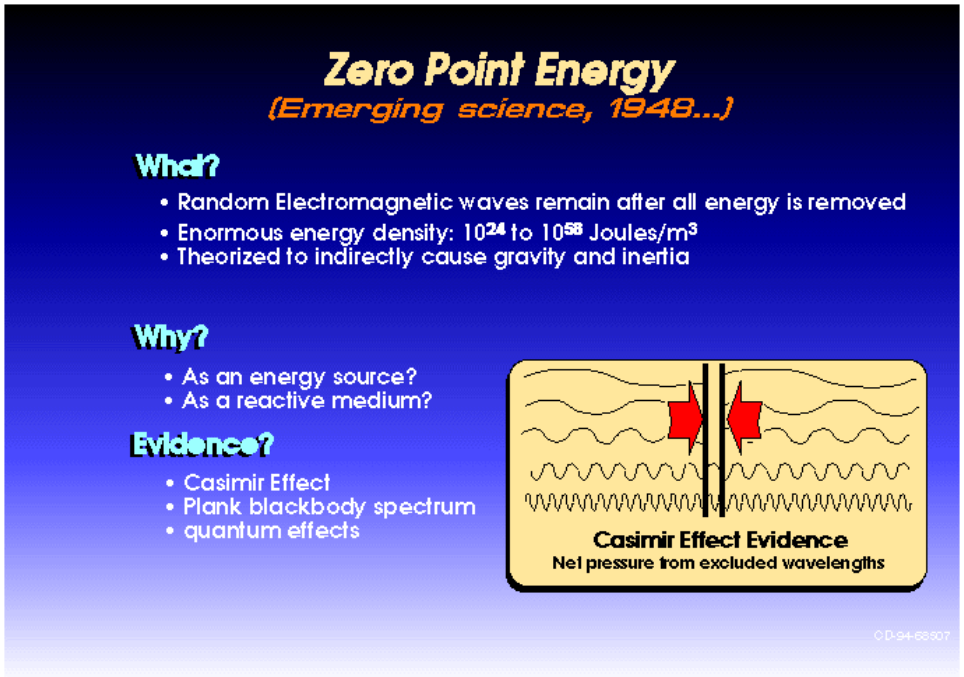
- There are several physicists working on a plausible theory of time travel using Einstein's Theory of Relativity and Hawking's Theory of Quantum Gravity



Physics and Limitless Energy

- With physics, it is possible to harness unlimited amounts of energy called zero point energy extraction from vacuum.
- With zero point energy extraction, you can have unlimited energy for all of the world's needs





Physics and Imagination

- ***Not only is the universe stranger than we imagine, it is stranger than we can imagine.***

Sir Arthur Eddington

Thank You

For further information contact me

drguven@live.com