Physics 496
Introduction to Research

Lecture 4.1: Using Analogies in Science

Definition

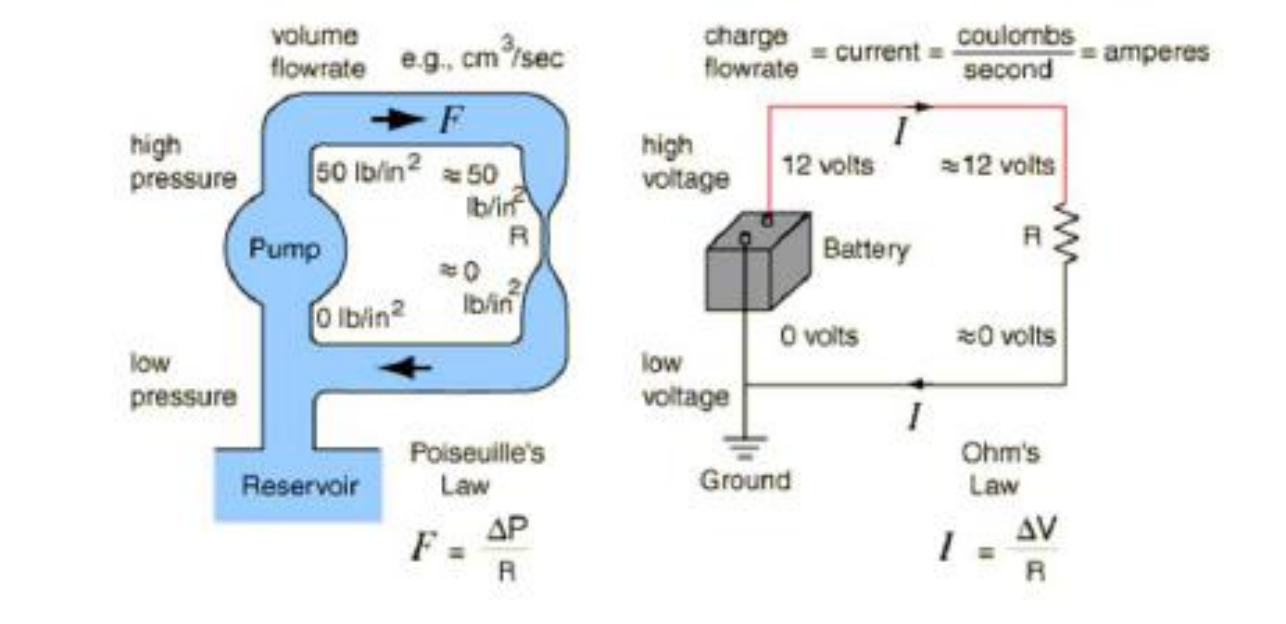
a-nal-o-gy [*uh*-**nal-***uh*-jee]: A comparison between two things, typically on the basis of their structure and for the purpose of explanation or clarification: *the analogy between the heart and a pump.*

An analogy is different than a simile. A simile is defined as
A figure of speech involving the comparison of one thing with another thing of a different kind, (e.g., *as brave as a lion*).

The difference is that a simile just says “this is like that”. Analogies are used to explain one thing by comparison to another thing that is known.

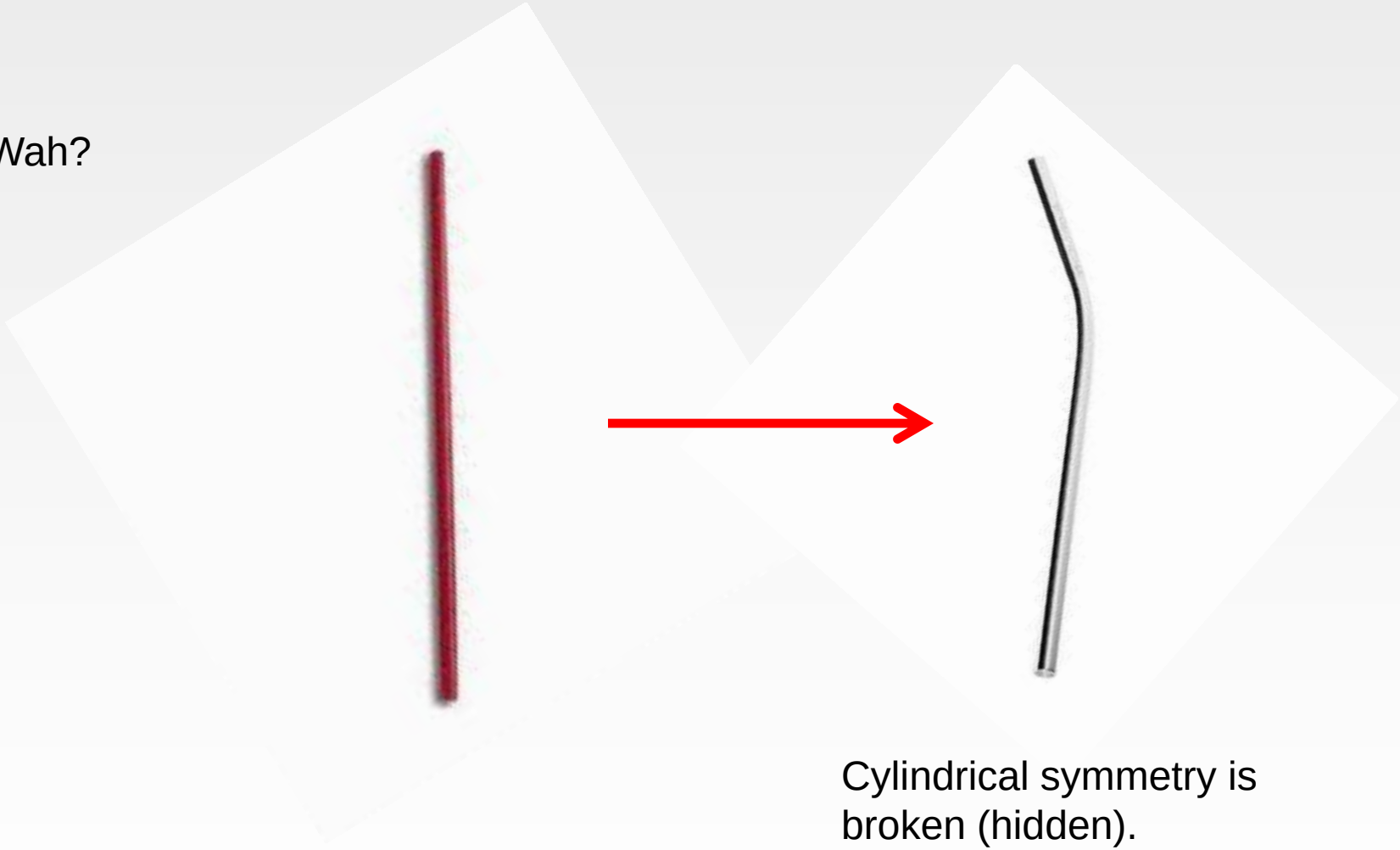
dc Water Circuit

Classic analogy for plumbers trying to understand electric circuits, or physics majors trying to understand plumbing.



Spontaneous Symmetry Breaking

Wah?



Cylindrical symmetry is broken (hidden).

Analogies are never perfect

An explanation of how the Higgs particle gives mass to other particles. It has some problems.

Another version

http://www.youtube.com/watch?v=qed3F0mVIbM

Analogies that are just similes

- Bacterial chromosomes are like spaghetti.
- Blood vessels are like highways.
- The camera is like an eye.
- The cell is like a factory.
- A nuclear reaction is like falling dominoes.
- Electricity is like flowing water.
- The immune system is like a police force.
- The internet is like an information superhighway.
- The muon is like a heavy electron.