



Discoveries in Physics

Schrödinger's Cat Paradox

Amy Upton



Erwin Schrödinger

Born: 12 August 1887, Erdberg, Vienna, Austria

Died: 4 January 1961, Vienna, Austria

He won the Nobel Prize in Physics 1933 for the discovery of new productive forms of atomic theory.

His notable works include “My View of the World” and “Nature and the Greeks”



The Cat Paradox - 1935

What you will need:

Steel box

Cat - alive

Geiger counter

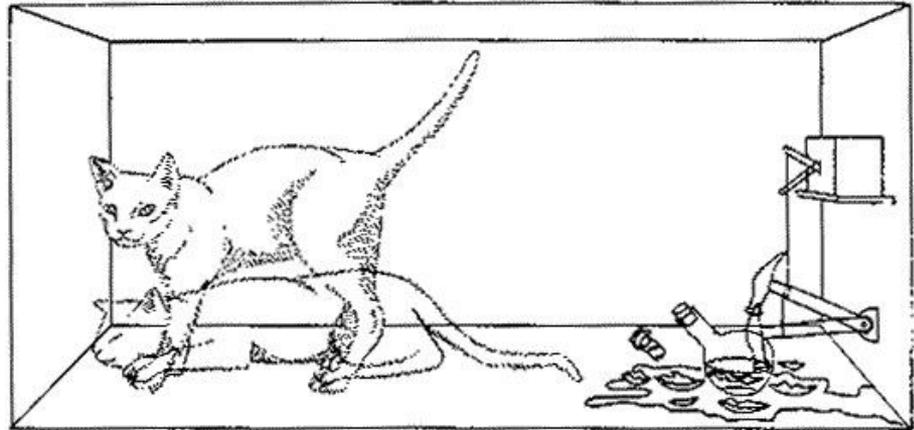
Vial of poison

Hammer

Radioactive substance

Method:

Place cat, geiger counter, vial of poison, hammer and radioactive substance in the steel box



The Cat Paradox - 1935



The Radioactive substance will decay, which will be detected by the Geiger counter. Then the Geiger counter will trigger the hammer which releases the poison, killing the cat in the process. However, the radioactive decay is random and there is no way to predict when it will happen. So from an outside perspective we don't know whether the radioactive substance has decayed and killed the cat or whether it hasn't. We also don't know when it will happen due to the unpredictability of radioactive decay. Physicists say it is a 'superposition' both decayed and not decayed at the same time. Posing the question is the cat dead or alive?

“Living and dead ... in
equal parts”

Erwin Schrödinger

The only way to know whether the
cat is dead or alive is to open the
box and observe the cat.

How This Relates to Physics

Schrödinger developed this paradox to illustrate a point in quantum mechanics about the nature of wave particles. Quantum theory - used to describe how subatomic particles behave - has an idea called wave function. Wave function is about all the possible states that subatomic particles can have such as energy, momentum and position. The wave function is a combination of all the possible wave functions but you can't say you know a position without observing it. E.g when you put an electron around a nucleus there are many positions it can be in which we don't know until we observe it. This is where the cat comes in, you don't know whether the cat is dead or alive until you observe it, much like wave function.