Quantum superposition.

To be and not to be.

William Erwin Shakinger.

Superposition:

- **wrong term** to describe unknown (unmeasured) state;
- before measurement each possible state has some probability of being outcome thereof;
- probabilities of all possible outcomes add up to one;
- **not**: it is in **superposition** of all possible states;
- **rather**: it is in **none** of them until measured;
- **better:** state is **undetermined** until measured.

Schrödinger's cat is NOT both dead and alive

until you open the box, it's always either one of those, but you just don't know!

(*That's what he actually meant when he came up with the example*).

Dutch proverb:

Niet geschoten is altijd mis;

if you don't shoot you'll always miss;

(i.e. *you'll never succeed if you don't try*).

WRONG!

If you don't shoot, it is *neither* a hit *nor* a miss.

Both terms just don't apply if you don't shoot.

Shoot?	Hit?	Miss?	Possible?
Yes	*No*	*No*	**No!**
Yes	*No*	*Yes*	*Yes*
Yes	*Yes*	*No*	*Yes*
No	***No***	***No***	**Yes!**

Niet geschoten is nooit mis;
niet geschoten is nooit raak.

I still miss my ex, so I signed up for a shooting class.

If you don't measure, you just don't know the state.

One should not say anything affirmative about the unknown.

Do not call it *superposition*, but *undetermined state*.

Unpredictability

seems fundamental,

but does it originate

from fundamental nescience

or from nature being

fundamentally stochastic?

Does mother nature really not know in advance what she'll do, or does she just not reveal it on beforehand?

Maybe she wants to SURPRISE us again and again?

To me, the underlying cause of unpredictablity seems irrelevant.

No need to actually
read measuring device.

It is not about actually
knowing the result.

Nature already did her thing
before Homo Sapiens evolved,
i.e. when "knowbody" existed.

Measurement ≡ **interaction**

between (elementary) ~~particles~~ entities.

State is undetermined
until an interaction occurs,
whether you know about it or not.

Probabilities of all possible states add up to 1
(of course!).

As far as I have learned:

Measured state applies only
when the interaction takes place.

Afterwards, it is once again
undetermined until next interaction.

Entanglement breaks
at the very next interaction.

~~Once a measurement is done~~

once an interaction has occurred,

the probability of the state equals 1

and that of all other (im)possible states

equals nought point nought.

Could it already have been 1 on beforehand, without us knowing that?

Nescimus, sic debemus tacere.

We don't know, so we must remain silent.

(Knowledge of) nescience is part of science,
but one should not say anything affirmative
about the unknown.

Wild assumptions are
NEVER EVER part of science;
the Latin word scientia means *know*ledge;
assumptions originate from *not know*ing.

Hypotheſes non fingo.

Isaacus Newtonus.

http://henk-reints.nl/astro/HR-Newton-Regulae-Philosophandi-Scholium-Generale.pdf

Unpredictability.

Suppose an electron and its antiparticle,
a positron, come together.

What we know:

They will annihilate, i.e. completely disappear
whilst two photons are produced with an energy
according to the electron & positron mass
as given by Einstein's famous $E = mc^2$.
In a barycentric frame, these photons will
leave in exactly opposite directions.

Unpredictability.

Suppose an electron and its antiparticle,
a positron, come together.

What we do not know:

In which exact direction the photons will leave.

This information seemingly arises out of the blue.

After all, they **will** leave in some direction.

The information about the motion of e^- & e^+
however fully disappears together with them.

Unpredictability.

Suppose an electron and its antiparticle,
a positron, come together.

Contemplation:

Did e^- & e^+ already hold photon direction info?

As far as we **NO**!

Do the photons still have info about e^- & e^+ ?

Not as far as we know (apart from the energy).

Conclusion: information is ***not*** preserved!

HR: *information* is not a physical quantity at all.

Unpostdictability.

Suppose two 511 keV photons are detected, going apart in exactly opposite directions.

What we can say:

They most probably originate from an e^- & e^+ annihilation.

Can we derive details of the original e^- & e^+ motion from these photons?

Nope.

We don't know where they came from.

At the quantum level,
the *past* is just as un*post*dictable
as the *future* is un*pre*dictable.

∴ We cannot go back in time,
at least not to where we came from.

We can never find out
the original condition.

The greatest enemy of knowledge is not ignorance,
it is the illusion of knowledge.

Stephen Hawking

The opposite of a correct statement is a false statement.
But the opposite of a profound truth may well be
another profound truth.

Niels Bohr

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