The Muon $g-2$ Anomaly Explained

Jorge Cham, aka, PHD Comics, illustrates the excitement over the muon anomaly results in a set of cartoons he made for Physics.

By Jorge Cham
The Muon 9-2 Anomaly Explained

The muon is the electron's heavier cousin.

'Sup, cuz!

Just like the electron, it has a magnetic moment that comes from its charge and quantum spin.

μ

Like all charged particles, it tends to interact with itself in a magnetic field, and in the process it creates other particles that exist for a brief moment in time.

μ

It does this in a quantum mechanical way, which means it creates many combinations of particles all the time, and all at the same time.

μ\rightarrow e + ?

That means that when you look at a muon, you don't just see the muon; you also see the infinite number of virtual particles it is constantly creating.

μ

Each of these particles affects the muon's magnetic moment in a measurable way, changing its value.

μ → e + γ

By using our catalog of known particles, we can predict what this change should be...

g = 2

...and compare it to experimental measurements of it.

g ≠ 2