

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**

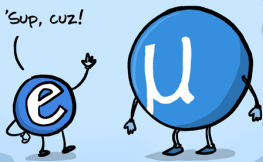
THE MUON $g-2$ ANOMALY EXPLAINED



THE MUON IS THE ELECTRON'S HEAVIER COUSIN.

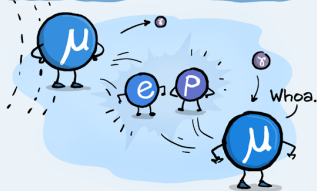
JUST LIKE THE ELECTRON, IT HAS A MAGNETIC MOMENT THAT COMES FROM ITS CHARGE AND QUANTUM SPIN.

'Sup, cuz!



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.

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.



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.

EACH OF THESE PARTICLES AFFECTS THE MUON'S MAGNETIC MOMENT IN A MEASURABLE WAY, CHANGING ITS VALUE.

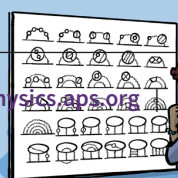
I don't know who you are any more.



$g = 2$ $g \neq 2$

BY USING OUR CATALOG OF KNOWN PARTICLES, WE CAN PREDICT WHAT THIS CHANGE SHOULD BE...

...AND COMPARE IT TO EXPERIMENTAL MEASUREMENTS OF IT.



$g?$

$g?$

