

Re: What is this "internal clock" in muon which slows down its rate of decay when they move very fast?

Source: <http://sci.tech-archive.net/Archive/sci.physics.particle/2005-01/0710.html>

From: Tom Capizzi (*etianshrldu_at_verizon.net*)

Date: 01/29/05

Date: Sat, 29 Jan 2005 17:49:54 GMT

"PD" <pdrafer@yahoo.com> wrote in message
news:1107016569.372650.160550@z14g2000cwz.googlegroups.com...
>
> *Michael Levin wrote:*
>> *Sorry if this is a stupid question – I'm a biologist with an amateur*
>> *interest in physics. I was listening to an audio lecture by Richard*
> *Wolfson*
>> *and he was talking about the experiment where, due to relativistic*
> *effects,*
>> *the lifetime of muons is extended due to their rapid motion (0.9c or*
>> *something like that) and the resulting time dilation. He was making*
> *the*
>> *point that it isn't just clocks that are affected by time dilation,*
> *but*
>> *everything (time itself). I think I follow all this stuff so far. But*
> *he*
>> *keeps talking about "the muon's internal clock". I am sure this must*
> *be a*
>> *euphemism for something, but what? What's this internal clock? Does*
> *a muon*
>> *have internal components of some sort which decide when it's to*
> *decay? It*
>> *would seem that the relativistic explanation for what's going on*
> *models the*
>> *muon as a physical clock-like process (which can be slowed). But,*
> *what is*
>> *the relationship between quantum mechanics' assertion that decay is*
> *in*
>> *principle unpredictable (presumably meaning, not controlled by*
> *mechanistic*
>> *factors) and this effect where it would seem that some process counts*
> *time*
>> *for the muon? I hope my question makes sense; I'd like to know if*
> *anything*

Re: What is this "internal clock" in muon which slows down its rate of decay when they move very fast?

sci.physics.particle: Re: What is this "internal clock" in muon which slows down its rate of decay when they move very fast?

>> *is known about how these two theories intersect in this case. Does
> the muon
>> have internal components which decide when to decay? If so, is it
> different
>> from "point" particles like electrons (and if yes, can the same sort
> of
>> relativistic experiment be done with them)? Any thoughts would be
>> appreciated!*
>>
>> --
>>
>> *Mike Levin
>> mlevin77@comcast.net*
>
> *Simply addressing the point as to whether the time dilation is real (as
> viewed in a frame where the particle is moving), note that g-2
> experiments store muons in storage rings (where they precess). Thus,
> both the speed of the muons is known (the muon bunches would proceed
> from station to station on the ring at a rate that is measurable), and
> the lifetime in the laboratory is known (by the decay rate from the
> population dN/dt). Thus the time dilation in this case is NOT simply
> inferred by the distance traveled.*
>
> *PD*
>

Would you mind elaborating that last cryptic comment? And are you saying time dilation is real or not?

Re: What is this "internal clock" in muon which slows down its rate of decay when they move very fast?