

## Re: Different laws of physics

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- *From:* Logan Kearsley <[chronosurfer@xxxxxxxxxx](mailto:chronosurfer@xxxxxxxxxx)>
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On Aug 19, 4:11 pm, Erik Max Francis <[m...@xxxxxxxxxxxxx](mailto:m...@xxxxxxxxxxxxx)> wrote:

Howard Brazee wrote:

Cosmologists sometimes talk about regions of space that don't have our laws of physics. This doesn't mean worlds where magic exists – but I'm wondering what it might mean. Different values of G? Different speeds of light? Different quantum mechanics? Different Newtonian laws?

It might mean all of these things, or more. We don't know what "parameters" make up the laws of physics in a Universe. So nobody really knows precisely what it means — or, indeed, even if the concept is reasonable. Our laws of physics may be the only internally consistent ones there are.

Well, we think we know some of them, although we may be wrong. The concept is at least sufficiently reasonable that several papers have been published on the subjects of what happens if the parameters are changed, what might cause them to change, and whether or not regions with different laws can be accessed from each other.

Note that when cosmologists *\_do\_* talk about these other-physics regions, they're usually talking about different physical universes, or regions of spacetime that are casually disconnected from ours. In other words, they're talking about places you could never, even in principle, visit (not that you'd want to) or interact with.

Usually, but not always. One thing that's fairly well established is that Stuff Works Differently above the energy scales where fundamental forces become unified. Bits of vacuum operating under those conditions are separated from 'normal' space by domain walls, but domain walls can also (so the math says, not that we've ever actually seen it) separate lower-energy regions where the forces separated differently when space cooled down.

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One of the neater ideas along those lines is a region of space where electricity and magnetism are decoupled, and photons have mass, which limits the range of electrical and magnetic fields and puts a minimum energy requirement on photon emission.

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