

Futures

Don't feed the physicists

Universal standards. By Alex Small

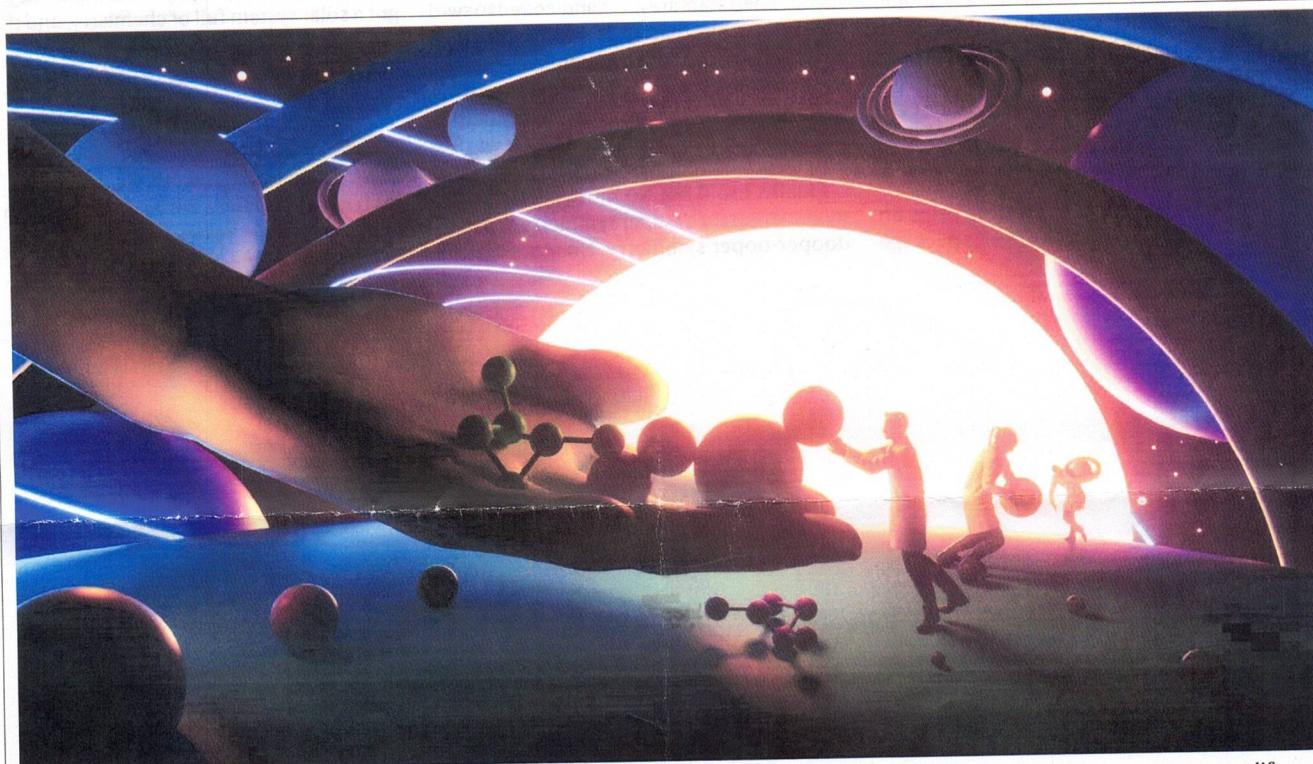


ILLUSTRATION BY JACEY

In the beginning there was light. It's in the basic universe starter kit, so atoms can exchange energy. You also need a sun, of course. A simple sun, without details, suffices for basic biology. Plants don't need realistic solar structure, they just need it to glow.

But Sam wanted to see the organic matter become intelligent, and the sales rep said intelligent life might figure out that we had just coded a giant light bulb into the sky. Then they go insane. So we went for a Tier Two physics package.

That's how they get you.

The basic physics package can do chemistry just fine, as long as you initialize the variables right. One guy accidentally left *Sodium_Start = 0* in his code, and when the animals developed thumbs they tried cooking and decided that God must hate them. Started worshipping the devil. Sam still teases him.

Anyway, realistic suns need fusion. Which means the nuclei need structure. Protons and

neutrons and quarks inside them, rather than little balls of positive charge.

The Tier Two physics package is just expensive enough to feel like you made a smart choice. Only suckers go cheap, because they'll still pay in the end, right?

Of course, you can also pay now AND pay later. Nuclear physics slows everything down, and I sure as hell can't afford to rent a huge server farm. I'm no Mammon.

So almost immediately we had to upgrade to a more efficient Tier Three physics package with symmetry in the equations: fewer variables, more elegant data structures, way faster run time. Paolo took one look at the trippy shapes and swirls in the symmetry documentation and was hooked. Sam hinted that I might regret it, but Paolo digs aesthetics, so OK, I bought the elegant code.

Well, Sam was right. He said not to kick myself, but he was right. Because you need way more than an intro computer-science class to work with this kind of code. No more

DIY hacks. Next time you want to modify your sim, you'll need consultants.

On the other hand, this stuff is lightning fast. Relativity is freaky weird, but universes with speed limits run way faster. Instead of every atom instantaneously interacting with all the other atoms, signals take time to arrive, and atoms interact with light only in their immediate neighbourhoods.

We went from 'Let there be light!' to dinosaurs in record time. Paolo was radiant. Wouldn't stop playing with it. Till he got drunk and fired a cosmic arrow at a planet. Bye-bye dinosaurs.

Then cute mammals took over. And everyone indulged them. Sam was all "Hey, the smart ones could navigate if we give them stars!" OK, fine, stars. We can hand-code distant stars without fusion modules. So we did distant stars. And they looked pretty. Paolo was beaming.

But then his sister, Athena, got ideas. "Let's do more than just specks in the sky! Let's

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give some of them structure, and structure within structure.” And Sam sided with her. OK, whatever, we’ve already purchased plenty of memory. So now we have galaxies with elegant spiral shapes and all that.

The galaxies were DIY. I know, I know, never send an amateur to do a professional’s job, but they’re so far away, it’s not like the mammals will ever reach them. No harm, no foul. And it was fun doing all-night coding binges together, like old times.

But some of those cute mammals got really smart. Like, too smart. And Sam said “Hey, what if they figure out relativity? We should give them a particle to test it with! Come on, just one more particle. That’s it, I promise.”

So I took his deal. And we made muons. And they were a hit with the mammals. Some even wrote books on relativity, and every book goes on and on about muon experiments. Mammal physicists love muons.

But I should have read the fine print on Sam’s deal. The Tier Three physics package

is all about symmetry, and symmetry means that things have partners. So you also get anti-muons. And special neutrinos to match the muons. And a bunch of other particles, too. Particle generation is built into the data structures.

So I had to pay a bunch of coders to spruce things up with way more particles. They, like, tripled the number of particles. Everything started slowing down again, even with Tier Three physics and professional patches.

But Sam still couldn’t leave it alone. Those galaxies that Paolo and Athena loved so much? Their stars are just hand-coded to swirl around in orbits that we decided, rather than moving naturally. And the mammals noticed the unnatural motion. So Sam whispered that there must be hidden explanations, stuff they can’t see. Dark matter, dark energy. He was like a literal prince of darkness.

Finally, I said no. No more particles. No more symmetry or super symmetry or super-duper-ooper symmetry. No more bizarre

geometry. Paolo and Athena didn’t like that, but they don’t own the hardware, so who cares what they think? Besides, I gave them Titan to play with, and they promptly filled it with hydrocarbons with aromatic shapes, and fractal coastlines. Paolo loved having another moon to play with.

Yeah, a few mammals are perplexed, speculating insane crap like maybe their universe is made of ten-dimensional strings. Like, come on, even the real world is only six-dimensional. What did Sam have them smoking? But I don’t care what their stoned physicists want. They’ve got a solar system full of chemistry, and that ought to be enough for any sentient.

And Samael? He can go to hell.

Alex Small is a professor of physics who writes fiction to see if he can. He doesn’t study particle physics, but he does work with three-dimensional beings exhibiting hints of intelligence.

THE STORY BEHIND THE STORY

Alex Small reveals the inspiration behind *Don’t feed the physicists*.

What if God is a programmer? That’s basically the simulation hypothesis: physics is inherently mathematical because the Universe is a calculation running on a computer. It took me a while to appreciate this notion. Intellectually, it seems like a modern Plato’s cave — fun to contemplate, but is it scientifically fruitful? As far as storytelling goes, we already have plenty of good (such as *The Matrix*) and not-so-good (*Matrix* sequels) stories about conflict in virtual worlds. I didn’t see anything to add.

Then I read Neal Stephenson’s *Fall: Dodge in Hell*, in which a character notes that relativity and the finite speed of light make calculations easier for computers (even if not for students). If matter interacted with everything everywhere all at once, we’d have way more forces to keep track of. Which would REALLY slow down the simulation.

Meanwhile, a textbook on my shelf describes the muon as “a nuisance particle... Physics as we know it today would be simpler without the muon, but the muon continues to exist just the same”. But after teaching relativity (which we need in order to truly understand electromagnetism), I realized that muons actually make physics simpler to teach: all the best example problems in relativity involve muons. Thank God for muons. Or whatever intern He assigned to code them.

Of course, the Devil’s in the details.

