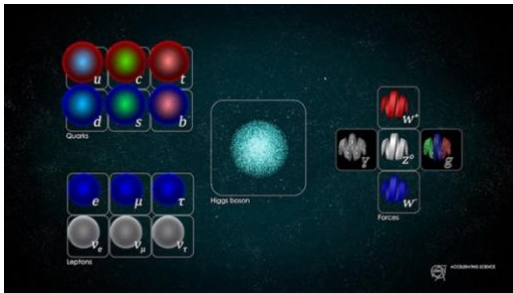


# Science and Digital Briefs

By Shopper Editor Dave Bunting

June 8, 2022



## What is the Standard Model of Particle Physics?

### Everything is made of particles.

For the past half century or so, a theory known by the understated name of the Standard Model has dominated the field of particle physics. This theory provides us with a detailed description of the 17 known fundamental particles, telling us how they should each behave and interact.

Since its introduction, this theory has turned out to be astoundingly successful. From the mathematical structure of the Standard Model, physicists have been able to make thousands of precise predictions, many of which have been compared to measurements performed at particle colliders. And, in almost every case, these predictions have turned out to be right.

### Fundamentals of particle physics

The entities described by the Standard Model include 12 particles known as fermions, and 5 called bosons.

**Fermions** are particles that you can think of as forms of matter, such as the familiar *electron*. Other kinds of fermions include *quarks* — which bind together to form protons and neutrons — as well as the ghostly particles known as *neutrinos*. For reasons we do not yet understand, fermions come in groups of three. For example, there are three electron-like particles: electrons, muons, and taus. Muons and taus are each a lot like electrons, except that they are heavier and unstable, meaning they are likely to quickly decay into other particles. Likewise, there are also three kinds of neutrinos (electron neutrino, muon neutrino, and tau neutrino), and three pairs of quarks (up and down, strange and charm, bottom and top).

The **bosons** of the Standard Model are responsible for the forces that act on matter and energy in our universe. The most well-known boson is the *photon*, which makes up light. The electromagnetic force comes into existence through interactions between photons and electrically charged particles. In other words, if the photon did not exist, there would be no electromagnetic force. Similarly, bosons called *gluons* are responsible for the strong nuclear force, which binds quarks together to form protons and neutrons. It also holds protons and neutrons together inside of atomic nuclei. A third force — the weak nuclear force — which is responsible for the radioactive decay of atoms, arises through the interactions of particles known as *W* and *Z* bosons. Meanwhile, the strength of the fourth force, gravity, is thought to be correlated to the *Higgs* boson.

### Cracks in the foundation

By any reasonable measure, the Standard Model has been a staggering success. But crucially, the Standard Model does not account for the existence of gravity. Despite considerable effort, we still don't know how to self-consistently include gravity in our theories of particle physics. We haven't been able to find a force-carrying particle for gravity.

Furthermore, cosmologists have theorized- think they have found- that our universe contains vast quantities of dark matter and dark energy, neither of which can be explained by anything in the Standard Model. Also, the [Big Bang](#) should have created equal amounts of matter and antimatter — yet nearly everything we see is made of matter.

By [Dan Hooper](#), Astronomy, Published: Thursday, May 19, 2022

Info: [shpr.fyi/standrdmodel](https://shpr.fyi/standrdmodel)



Natural Fiber Fabrics at SEWN Sewing Room in Yakima

Image: Caitlin Towry

## Yakima's SEWN offers sewing classes

By CAITLIN TOWRY Special to the Yakima Herald-Republic May 24, 2022

Caitlin Towry is a blog writer and mother of three in Naches.

For more than a year, an independent fabric shop has quietly become a haven for local sewists. Owned by Eisenhower High School alum Sierra Hutton, Sewn is a thoughtfully curated fabric shop geared toward garment-making.

Sewing is lifelong passion for Hutton.

"My mom likes to say that I was using a serger at 3 years old," she said.

After attending college, Hutton returned to Yakima with a mission in mind.

"I've lived in Seattle, I've lived in Massachusetts for a while, and I've always had a little fabric store that I could go to. I realized that there just wasn't anything like that here, so I decided to open my own," she said.

The focus of Sewn is sustainability. While they offer newly milled fabrics, like hemp and linen, Sewn also offers a number of quality secondhand fabrics found at places like estate sales.

They also sell deadstock — unused fabric from the fashion industry that is generally thrown into the landfill after a while.

Part of Sewn's mission is education, so they offer project-based sewing classes. With a maximum size of six students, classes are intimate and informative, providing the opportunity to receive helpful feedback every step of the way.

SEWN is at 25 N. Front St. Hours are Tuesdays-Fridays, 11 a.m.-6 p.m., and Saturdays 11 a.m.-4 p.m. To learn more, check out their website, [www.sewnfabrics.com](http://www.sewnfabrics.com), as well as their Instagram, [@sewnfabricstore](https://www.instagram.com/sewnfabricstore).

Info: <https://shpr.fyi/sewn>

**Editor note:** Sewing and fabrics may not sound like science for my Science column, but fabric technology is definitely real science- here's a link to a degree in [Milling Science-shpr.fyi/millingdegree](#).

Years back, I had a pair of jeans with a peculiar problem: the thread holding the seams kept failing, leaving my rear end open to onlookers, often requiring repair, while the fabric lasted many years. I learned that Kevlar- I used it for repair- was then the strongest fiber, weight for weight stronger than steel, and that cotton is also very strong. The synthetics nylon, rayon, polyester, etc. don't stand abrasion well and soon wear through.

I've also recently learned that the polyester towels we buy mostly now are not absorbent- drying our hands with them leaves our hands maddeningly wet. Cotton and linen fiber are very absorbent fibers, but fabrics go through many complex treatments as they are milled. Some cotton- but not all- is treated to make its color fast making it as non-absorbent as polyester.

Further, my mother having been a very skilled seamstress, I've always strongly encouraged teaching of sewing to young and all people!

Read this week's Bible Readings on page 6 which includes,

"What is man that you are mindful of him, the son of man that you care for him?... You made him ruler over the works of your hands; you put everything under his feet..." Psalm 8:4-6 NIV

Dave Bunting, June 6, 2022  
Credits in links below items.  
See these columns on my blog [daverant.com](http://daverant.com)

