

Saturday Citations: Adorable kittens, violent pulsars, brand-new fusion reactor and a proposed giant cosmic void

December 2 2023, by Chris Packham



Three extremely rare white lion cubs were born at the Las Delicias Zoo in Venezuela.

This week in our wrap up, we lull you into a false sense of security with

adorable lion cubs then ambush you with terrifying pulsars. We do this not out of a sense of malice but to prepare your mind for the possibility of a giant cosmic void. Also, Japan has launched a new fusion research facility.

Birth announced

Camatagua and Sebastian, white lions at the Las Delicias Zoo in Venezuela, are overjoyed to announce the arrival of their precious triplets, [the first white lions born in captivity in the country](#).

With their beautiful faces, chubby little paws, and an allele-caused leucism genetically analogous to the one that causes albinism, these three beautiful souls are surrounded by a loving veterinary team, including seven caregivers. The parents, both of whom carry the recessive gene responsible for leucism, the occurrence of which is extremely uncommon, thank you for sharing this joyous occasion.

Pulsars intemperate

OK, imagine a [horror film](#) in which a victim is trapped in a tiny room with a killer holding a chainsaw at arm's length and spinning wildly in 360-degree rotations. This is pretty close to the predicament of the companion stars of spider pulsars. Pulsars are the dense, spinning cores that remain after a massive star collapses into a neutron star.

They produce lighthouse-like beams of radiation that make the star appear to pulse as it spins. Millisecond pulsars spin up to hundreds of times a second. A category of [millisecond pulsars](#) called spider pulsars is named for the damage they cause to unfortunate companion stars.

These systems tend to orbit closely, allowing the pulsars to inflict massive damage on their companions. Anyway, after discovering 18

millisecond pulsars in Omega Centauri, researchers at the University of Alberta studied Chandra data to determine if any of them were emitting X-rays.

They found 11, five of which were spider pulsars. Redback spider pulsars have larger companions, while black widow spider pulsars have companions with less than 5% of the sun's mass. The researchers [report](#) that the larger the companion, the brighter the X-ray emissions from the [pulsar](#).

Proposal immodest

In 1992, astronomers with NASA's COBE mission published the first precise measurements of the cosmic microwave background radiation, a remnant of the primordial universe that fills all observable space. It's the best evidence ever found for the Big Bang.

Hubble's law states that galaxies move away from the Earth at speeds proportional to their distance as determined by observed redshift. It provided the first observational evidence of the Big Bang. However, there are statistically significant measurement uncertainties about the proportionality of speed and distance, known as the Hubble constant. Because scientists like being able to point at something and name it, these discrepancies are called the Hubble tension.

Essentially, the measured expansion rate based on nearby galaxies is 10% larger than predicted by CMB observations, meaning that the universe would be 10% younger than the measured ages of the earliest stars.

[Researchers are now proposing the absolute gnarliest possible resolution of the Hubble tension](#): We're living in a giant void in space. Specifically, the Milky Way galaxy is near the center of a void about 1 billion [light](#)

[years](#) in radius with a density 20% lower than the average of the universe as a whole.

The result would be an inflation of local measurements caused by outflows of matter from the giant void, as they exert a bigger gravitational pull than lower-density matter within the void.

Nuclei commingled

Fusion technology, which generates energy by fusing two [atomic nuclei](#) instead of splitting them, is still in its infancy, a childhood that began around 1940, so it's probably going to be a pretty long haul before we get this kid out of the house.

But Japan inaugurated the world's largest experimental nuclear fusion reactor on Friday, the [JT-60SA reactor](#), a tokamak vessel that will contain plasma at 200 million degrees Celsius. Fission reactors have a pretty bad reputation for catastrophic accidents, and fusion reactors don't carry those risks.

Ultimately, physicists hope to generate carbon-free energy so cheaply that it can't be metered, an economic proposition welcomed and celebrated by environmentalists and not so much by capitalists everywhere.

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