

# Best of Last Week—New phase of matter, a replacement for silicon, a better vaccine for omicron subvariants

July 25 2022, by Bob Yirka

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A team of researchers says cubic boron arsenide is the best semiconductor material ever found, and maybe the best possible one. Credit: Christine Daniloff/MIT

It was a good week for physics as a team with members affiliated with several institutions in the U.S. created [a strange new phase of matter in a](#)

[quantum computer](#) that acted like it had two dimensions. And an international team of physicists found that when an atom's nucleus becomes overfilled with neutrons, [it can impose a more stable state](#) by spitting out a proton.

In technology news, a team with members from MIT, the University of Houston, the University of Texas and Boston College, found [a possible replacement for silicon](#) in electronic devices. Called cubic boron arsenide, it was better able to conduct heat and was more accommodating to "holes." Also, an international team developed [an all-in-one, solar-powered tower](#) that was able to make carbon-neutral jet fuel. They demonstrated the thermochemical process chain from CO<sub>2</sub> and water to kerosene in their single-tower configuration. And a team with members from several institutions in the U.S. and Italy reported [a possible step toward cheaper hydrogen-based energy](#)—a method for predicting platinum alloy's potency and stability. Also, a team at the Max Planck Institute for Intelligent Systems designed and built [a robot dog](#) that could learn to walk in just one hour.

In other news, a team at the University of California's San Diego School of Medicine discovered [a set of gene mutations in humans](#) that protects against cognitive decline in older people. Further research suggested that they were caused by selective pressure from infectious pathogens like gonorrhea. And a team at Institut Pasteur found evidence that SARS-CoV-2 is able to enter the brains of infected people [by using nose cells to create nanotube tunnels](#). Also, a large team of researchers from Canada, the U.S., and Russia found evidence showing that [early Siberian dogs relied on the seafood diets of humans](#)—and they also found that as early as 7,400 years ago, the dogs had evolved to rely on human assistance for survival. And finally, a team at Yale University developed [a novel omicron-specific mRNA vaccine](#) that offers superior protection against the BA.1 and BA.2.12.1 subvariants.

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