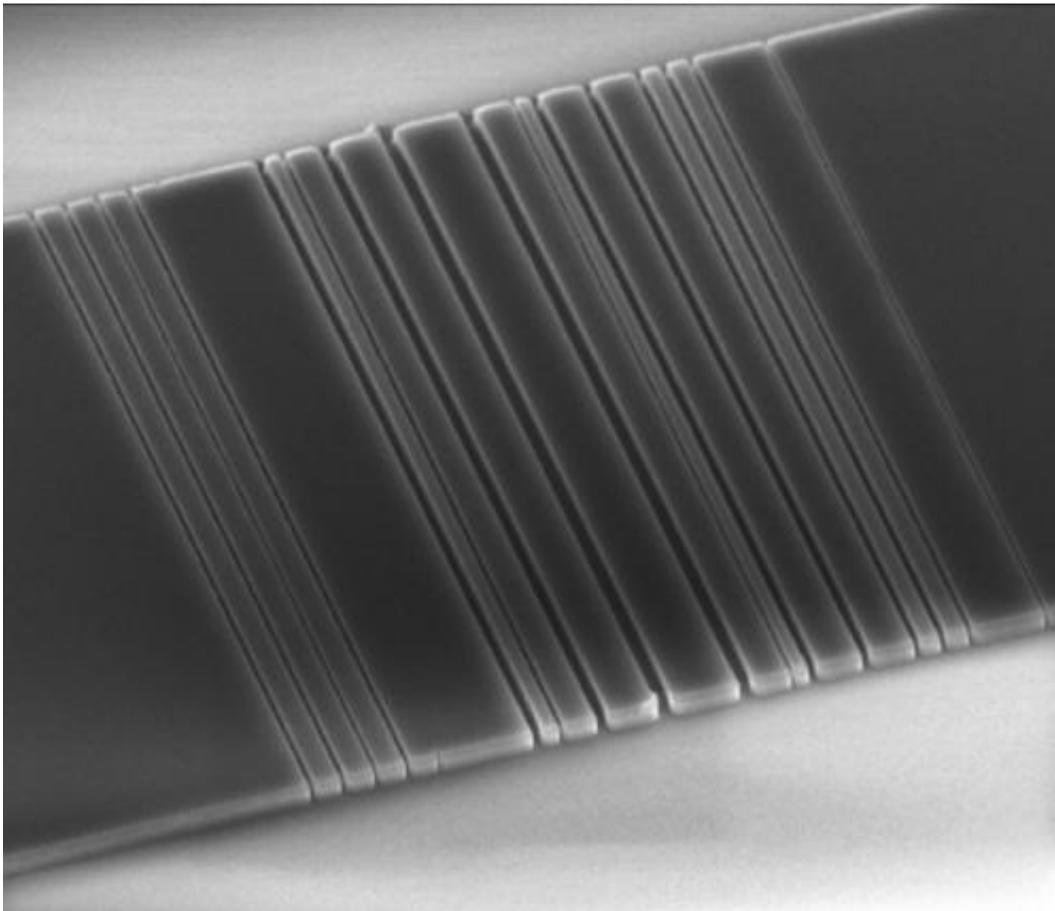


# Ten of the biggest science and technology stories of 2014 on Phys.org

December 30 2014, by Bob Yirka

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This tiny slice of silicon, etched in Jelena Vuckovic's lab at Stanford with a pattern that resembles a bar code, is one step on the way toward linking computer components with light instead of wires. Credit: Vuckovic Lab

(Phys.org)—This past year was an exciting time for science

researchers—new discoveries and advances were made and more was learned about space, sub-atomic physics, speeding up computers and historical accomplishments, to name just a few. Below, we highlight what we feel were ten of the biggest stories of the year:

**[Superheavy element 117 was confirmed by a research team in](#)**

**[Germany](#)**—The periodic table of elements grew bigger by one as an international team of researchers working at Germany's GSI laboratory artificially created atoms of element 117 using an accelerator. The group published its findings in *Physical Review Letters*, outlining how they caused the atoms to come about and describing it as 40 percent heavier than lead. The new element will get a formal name only after formal review by the International Unions of Pure and Applied Physics and Chemistry.

**[Engineers took a big step toward using light instead of wires inside of computers](#)**—

A team working at Stanford designed and built a prism-like device able to split light into its separate colors and then to bend each of the different components at right angles. They described their "optical link" in a paper published in *Scientific Reports*. It is a very small slice of silicon etched with a specific pattern that looks a lot like a bar code. The team believes the device could lead to using optics rather than electricity to carry data around inside of a computer.

**[Superconductivity achieved without the need for cooling](#)**—

a team of researchers from across the globe working at the Max Planck Institute and the SLAC National Accelerator Laboratory, succeeded for the first time in achieving superconductivity in a material without having to cool it down first. As the group explained in a paper published in the journal *Nature*, they used short infrared laser pulses to cause a piece of ceramic to become superconductive, if only for a few millionths of a second. Excitingly, the team was able to offer a plausible explanation as to why it worked.

### **[Ancient Egyptians likely moved pyramid stones over wet sand—](#)**

Physicists working at the University of Amsterdam and the FOM Foundation discovered through experimentation that ancient Egyptian workers likely added water to the sand over which sledges bearing heavy stones meant for use in the pyramids were pulled, to make it easier to slide. The team reported in a paper published in *Physical Review Letters* that using just the right amount of water in the mix would have reduced the number of men needed to pull the sledge by half. The idea was supported by a wall painting dating from that time showing water being added to sand just ahead of a pulled sledge.

### **[A radio-burst discovery deepened an astrophysics mystery—](#)**

Scientists working at the Arecibo radio telescope in Puerto Rico reported in a paper published in *The Astrophysical Journal*, that they had recorded a split-second radio wave burst that appeared to come from deep in outer space. The discovery was the first to corroborate reports of similar bursts recorded by researchers at the Parkes radio telescope in Australia. Neither team has been able to identify the source of the bursts, but possibilities include: flares from magnetars, evaporating black holes or mergers of neutron stars.

### **[Researchers achieved 'holy grail' of battery design: A stable lithium anode—](#)**

Last summer, researchers at Stanford announced that they had taken a big step toward the design of a pure lithium anode. As they noted in a paper published in *Nature Nanotechnology*, an anode of pure lithium would be a huge boost to battery efficiency. Lithium is believed to hold the greatest potential for reaching the "holy grail" of batteries, because of its light weight and high density. They suggest that some additional engineering and new electrolytes might make it possible to create a practical and stable lithium metal anode that could be used to power the next generation of rechargeable batteries.

### **[Quantum physics got less complicated—](#)**Just this past month, an

international team of researchers working at the National University of Singapore reported that they had found evidence that wave-particle duality is actually the quantum uncertainty principle in disguise, reducing two mysteries to just one. In a paper published in *Nature Communications*, the team describes how they were able to prove that the two concepts were one and the same, and suggest their finding could lead to a deeper understanding of [quantum physics](#) and possibly new applications of wave-particle duality.

### **[The first possibly habitable Earth-sized planet was confirmed—](#)**

Researchers working at NASA's Kepler Space Telescope last spring reported sighting the first exoplanet roughly the size of the Earth, orbiting within what has become known as the "habitable zone" of another star—the sighting was subsequently verified by teams working at the Gemini and Keck Observatories. Because of its proximity to its star, the planet, dubbed Kepler-186f, could feasibly harbor water, the team explained in a paper published in the journal *Science*. The newly discovered planet is part of the Kepler-186 star system located in the constellation Cygnus.

### **[Scientists discover how to turn light into matter after 80-year](#)**

**[quest—](#)**A small team of theoretical physicists working at Imperial College in London developed a method to test whether smashing two photons together to create an electron and positron will result in the formation of matter—thereby proving correct a theory first proposed back in 1934 by Breit and Wheeler. The team reported in a paper published in *Nature Photonics* that they developed the idea while chatting over coffee. They will be leaving it up to other researchers working at an accelerator to actually carry out the experiment to prove the idea sound once and for all.

### **["Sailing stones" of Death Valley mystery solved as they were seen in action for the first time—](#)**After centuries of conjecture, a small

team of researchers has solved the mystery of how the "sailing stones" move across the desert floor, leaving evidence trails behind them. As they describe in a paper published in the journal *PLOS ONE*, the researchers set up a camera at just the right time and fortuitously caught the action in progress. Turns out the stones were moved by ice that had formed from a thin layer of water on the desert floor and then by wind pushing the ice against them.

To learn about other exciting news in science and technology, we have set up a [page](#) that allows for easy reading of all of the top stories of the past year.

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