

CELEBRATING



YEARS
1955-2015

GUINNESS WORLD RECORDS 2015



INSIDE: ALL-NEW
AUGMENTED REALITY!

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Cutting-edge science

As helium was first **discovered on the Sun**, it was named after Helios, the Greek sun god



Most accurate clock

Researchers at the Joint Institute for Laboratory Astrophysics (JILA)—a project initiated by the University of Colorado and the US National Institute of Standards and Technology—have used the element strontium to create an atomic clock that will neither gain nor lose a second in 4.5 billion years. The research was announced on Jan 22, 2014. Because the SI definition of the second is based on the caesium atom, caesium clocks were previously regarded as the most accurate.



First country to mine gas hydrates

Gas hydrates, aka “flammable ice,” are a solid resembling water ice. They contain methane gas trapped in a crystalline structure and occur beneath sediments on the ocean floor. In Mar 2013, Japan announced that it had successfully extracted methane gas from hydrate deposits in



the Nankai Trough, 30 mi (50 km) offshore from Japan. Scientists estimate that there could be enough hydrate deposits in the Nankai Trough to meet Japan's energy needs for a decade.

First photon interaction

In Sep 2013, researchers from Harvard University and the Massachusetts Institute of Technology (both USA) completed an experiment that compared the interaction of protons to the behavior of light sabers, the fictional weapons used in *Star Wars*. Researchers observed an attractive force between two photons—the basic particles that form light—which interacted to form a

joined, two-photon molecule. This indicated that photons could be manipulated to create a solid “blade” of light, like a light saber.

Highest manmade RPM

Scientists at the University of St. Andrews in the UK created a tiny sphere of calcium just 4 micrometers (0.00015 in; 0.004 mm) across, around 10 times narrower than a human hair. They suspended the sphere using laser light inside a vacuum and made it spin by altering the polarity of the light. On Aug 28, 2013, the team published the results of their research, which observed the calcium sphere reaching 600 million revolutions per min (RPM) before disintegrating.

Thinnest manmade material

In Oct 2004, British and Russian scientists announced the discovery of the monolayer of graphene. With a thickness of just one single atom

Most accurate electron mass measurement

On Feb 19, 2014, the Max Planck Institute for Nuclear Physics (DEU) announced the mass of an electron measured at 0.000548579909067 of an atomic mass unit. It was measured by binding a single electron to a bare carbon nucleus in a Penning trap (above) and manipulating it with electric and magnetic fields. The result is ca. 13 times more accurate than previous efforts.



Fastest computer

The supercomputer “Tianhe-2,” developed by China's National University of Defense Technology performs at 33.86 petaFLOPS on the Linpack benchmark (see below). The list of the most powerful supercomputers was announced on Jun 17 during the opening session of the 2013 International Supercomputing Conference



Enormous instruments

In 1955, the largest scientific instrument was the Radio Telescope of the Manchester University Experimental Station in Cheshire, UK. “The filigree skeletal bowl and 180-ft (54-m) high supports weigh 1,500 tons [1,524 metric tons].” Today, the record is held by the Large Electron-Positron storage ring collider at CERN in Geneva, Switzerland, which was built to examine the smallest and

FACT

A supercomputer's performance is measured in FLOPS—Floating-point Operations Per Second. A floating-point operation is the calculation of a mathematical equation, so a petaFLOP, as used to measure the fastest supercomputer (above), means

COMPUTING EFFICIENCY

Computations per kilowatt-hour

