God particle detected!

A rumor is floating around the physics community that the world's largest atom smasher may have detected a long-sought subatomic particle called the Higgs boson, also known as the "God particle."

The controversial rumor is based on what appears to be a leaked internal note from physicists at the Large Hadron Collider (LHC), a 17-mile-long particle accelerator near Geneva, Switzerland. It's not entirely clear at this point if the memo is authentic, or what the data it refers to might mean but the note already has researchers talking.

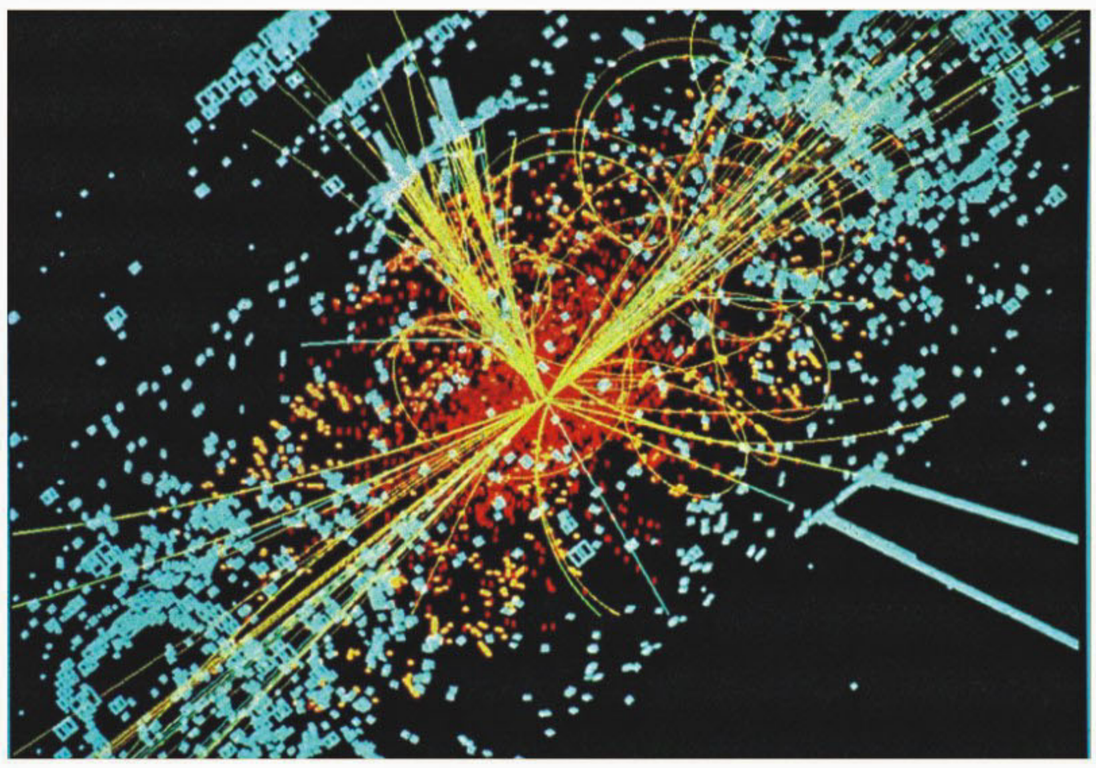
The buzz started when an anonymous commenter recently posted an abstract of the note on Columbia University mathematician Peter Woit's blog, Not Even Wrong.

Some physicists say the note may be a hoax, while others believe the "detection" is likely a statistical anomaly that will disappear upon further study. But the find would be a huge particle-physics breakthrough, if it holds up.

"If it were to be real, it would be really exciting," said physicist Sheldon Stone of Syracuse University.

The Higgs boson is predicted to exist by prevailing particle-physics theory, which is known as the Standard Model. Physicists think the Higgs bestows mass on all the other particles but they have yet to confirm its existence.

Huge atom smashers like the LHC and the Tevatron, at Fermilab in Illinois are searching for the Higgs and other subatomic bits of matter. These accelerators slam particles together at enormous speeds, generating a shower of other particles that could include the Higgs or other elemental pieces predicted by theory but yet to be detected. [Wacky Physics: The Coolest Little Particles in Nature]



This track is an example of simulated data modelled for the CMS detector on the Large Hadron Collider (LHC) at CERN. Here a Higgs boson is produced and then decays into two jets of hadrons and two electrons

The leaked note suggests that the LHC's ATLAS particle-detection experiment may have picked up a signature of the elusive Higgs. The signal is consistent, in mass and other characteristics, with what the Higgs is expected to produce, according to the note.

However, some other aspects of the signal don't match predictions.

"Its production rate is much higher than that expected for the Higgs boson in the Standard Model," Stone told SPACE.com in an email interview. So the signal may be evidence of some other particle, Stone added, "which in some sense would be even more interesting, or it could be the result of new physics beyond the Standard Model."

Too soon to tell

Stone was quick to point out that the note is not an official result of the ATLAS research team. Therefore, speculating about its validity or implications is decidedly preliminary.

"It is actually quite illegitimate and unscientific to talk publicly about internal collaboration material before it is approved," Stone said. "So this 'result' is not a result until the collaboration officially releases it."

Other researchers joined Stone in urging patience and caution before getting too excited about the possible discovery.

"Don't worry, Higgs boson! I would never spread scurrilous rumors about you. Unlike some people," Caltech physicist Sean Carroll tweeted today (April 22).

While it's still early, some researchers have already begun to cast doubt on the possible detection. For example, Tommaso Dorigo a particle physicist at Fermilab and CERN, which operates the LHC thinks the signal is false and will fade upon closer inspection.

Dorigo who said he doesn't have access to the full ATLAS memo gives several reasons for this viewpoint. He points out, for example, that scientists at Fermilab didn't see the putative Higgs signal in their Tevatron data, which covered similar ground as the ATLAS experiment.

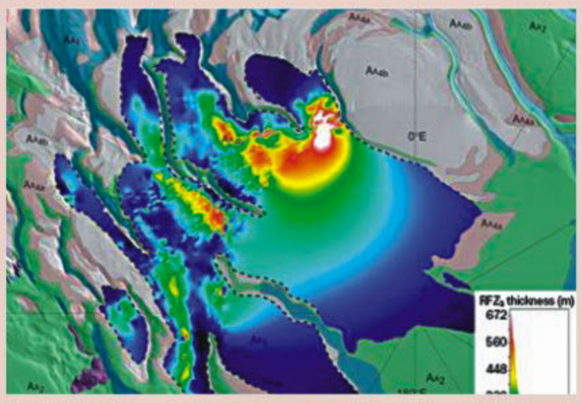
Dorigo feels strongly enough, in fact, to put his money where his mouth is.

"I bet $1,000 with whomever has a name and a reputation in particle physics (this is a necessary specification, because I need to be sure that the person taking the bet will honor it) that the signal is not due to Higgs boson decays," he wrote on his blog today. "I am willing to bet that this is NO NEW PARTICLE. Clear enough?"

Source: Live Science

WONDERS OF RED PLANET

Dry ice, wetter Mars



Newfound reservoir of frozen CO_2 at Mars' south polar cap (blue)

A newfound reservoir of dry ice on Mars suggests that the planet's surface has been wetter in the relatively recent past, though not necessarily warmer than it is today.

The new study adds to evidence that Mars once had a carbon dioxide atmosphere thick enough to keep liquid water on the surface from evaporating. It's unclear whether the planet would have been hospitable for life, however, because temperatures on Mars may actually have been slightly colder during times when the atmosphere had a greater amount of carbon dioxide.

Roger Phillips of the Southwest Research Institute in Boulder, Colo., and his colleagues base their findings on radar studies by the Mars Reconnaissance Orbiter of the layered deposits at Mars' south polar cap. Earlier studies had indicated that a veneer of frozen carbon dioxide sits atop part of the cap with a thin layer of water ice beneath it. But a detailed analysis of radar reflected from different layers of the cap reveals that beneath the frozen water lies a volume of carbon dioxide ice 30 times greater than previously estimated, the team reports online April 21 in Science.

This unexpected reservoir of dry ice is intriguing, Phillips says, because about every 100,000 years Mars is known to dramatically tilt its spin axis. During these periods of high polar tilt, enough sunlight falls on the poles to vaporize the frozen carbon dioxide and release it into the atmosphere, roughly doubling the atmospheric pressure on the Red Planet. With a denser atmosphere, liquid water could persist on the surface rather than evaporating, and might account for some of the features on Mars that appear to have carved by water, such as channels and gullies, Phillips notes.

Source: Science News

ATTENTION, PLEASE

'Invisible gorillas'

Video from 1999's "invisible gorilla" experiment howed people passing a basketball in a circle although the basketball isn't visible

EAT your heart out, Houdini. Average schmoes can make a gorilla-suited dude pounding his chest go poof, thanks in part to a common difficulty with focusing on distractions.

People who don't see unexpected happenings, such as a gorilla strolling by, while concentrating on a task often have difficulty with what amounts to mental multitasking, says a team led by psychology graduate student Janelle Seegmiller of the University of Utah in Salt Lake City.

Individuals who do poorly on a test requiring them to perform two mental operations at once are especially prone to an experimental effect dubbed "the invisible gorilla," Seegmiller and her colleagues report in the May Journal of Experimental Psychology: Learning, Memory and Cognition.

Previous studies of this effect have instructed participants to count the number of times people in a video pass a basketball to one another. Nearly half of volunteers don't notice a person in a gorilla suit walk among the players, pause for a few chest thumps and depart.

Source: Science News

NANOVAULT

Nanotech to deliver drug

THERE'S no question, drugs work in treating disease. But can they work better, and safer? In recent years, researchers have grappled with the challenge of administering therapeutics in a way that boosts their effectiveness by targeting specific cells in the body while minimizing their potential damage to healthy tissue.

The development of new methods that use engineered nanomaterials to transport drugs and release them directly into cells holds great potential in this area. And while several such drug-delivery systems -- including some that use dendrimers, liposomes or polyethylene glycol -- have won approval for clinical use, they have been hampered by size limitations and ineffectiveness in accurately targeting tissues.

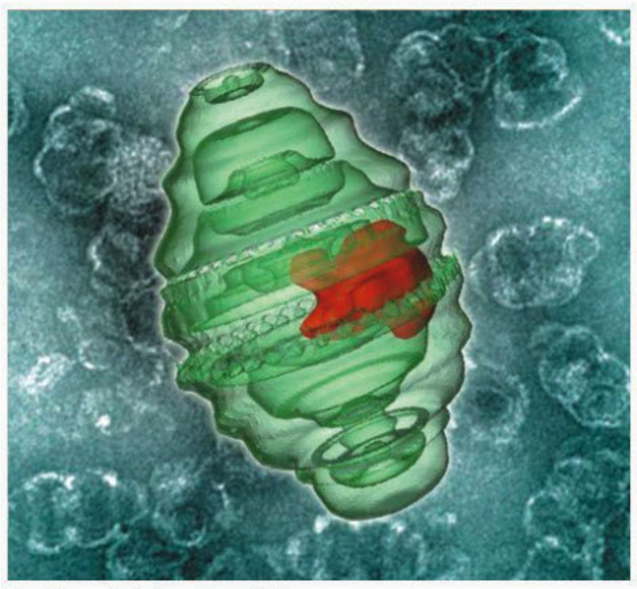
Now, researchers at UCLA have developed a new and potentially far more effective means of targeted drug delivery using nanotechnology.

In a study to be published in the May 23 print issue of the journal Small, they demonstrate the ability to package drug-loaded "nanodisks" into vault nanoparticles, naturally occurring nanoscale capsules that have been engineered for therapeutic drug delivery. The study represents the first example of using vaults toward this goal.

The UCLA research team was led by Leonard H. Rome and included his colleagues Daniel C. Buehler and Valerie Kickhoefer from the UCLA Department of Biological Chemistry; Daniel B. Toso and Z. Hong Zhou from the UCLA Department of Microbiology, Immunology and Molecular Genetics; and the California NanoSystems Institute (CNSI) at UCLA.

Vault nanoparticles are found in the cytoplasm of all mammalian cells and are one of the largest known ribonucleoprotein complexes in the sub-100-nanometer range. A vault is essentially barrel-shaped nanocapsule with a large, hollow interior -- properties that make them ripe for engineering into a drug-delivery vehicles. The ability to encapsulate small-molecule therapeutic compounds into vaults is critical to their development for drug delivery.

Recombinant vaults are nonimmunogenic and have undergone significant engineering, including cell-surface



Vault containing nanodisk

receptor targeting and the encapsulation of a wide variety of proteins.

"A vault is a naturally occurring protein particle and so it causes no harm to the body," said Rome, CNSI associate director and a professor of biological chemistry. "These vaults release therapeutics slowly, like a strainer, through tiny, tiny holes, which provides great flexibility for drug delivery."

The internal cavity of the recombinant vault nanoparticle is large enough to hold hundreds of drugs, and because vaults are the size of small microbes, a vault particle containing drugs can easily be taken up into targeted cells.

With the goal of creating a vault capable of encapsulating therapeutic compounds for drug delivery, UCLA doctoral student Daniel Buhler designed a strategy to package another nanoparticle, known as a nanodisk (ND), into the vault's inner cavity, or lumen.

Source: Science Daily

MELTING AWAY

Glacier holds big surprise

A glacier range the size of the state of New York surprisingly contributes 10 percent of the world's melting ice, making it a primary contributor to rising sea levels.

"The Canadian Arctic, which we previously thought wasn't contributing very much to ice loss, has actually become one of the largest contributors," said study researcher Alex Gardner at the University of Michigan. "Most of the world's fresh water is stored in glaciers and caps, and they are one of the primary drivers of sea level change." [In Photos: Amazing Glaciers]

Researchers have been watching this glacier range in the Canadian Arctic Archipelago for decades, but because of its remote location they weren't able to get accurate readings of how much it was being affected by the gradually increasing temperatures, particularly in summer, which some researchers attribute to global warming, though it's hard to say over the short term of this study.

NASA , in making ice loss estimates in the 1990s, had determined that the glacier had been losing volume. Gardner looked at more recent changes: during the years 2004 to 2009. Over that study period, he found, the glacier lost a volume equivalent to about 75 percent of Lake Erie, the majority of that loss happening between 2007 and 2009. In these years, the loss was four times what it had been in the late 1990s.

Studying remote glaciers

The Canadian Arctic Archipelago includes thousands of islands covering 550,000 square miles (1.4 million square kilometers), nearly the size of Alaska. It is home to one of the largest freshwater glacier ranges on Earth, which has 3½ times the volume of the combined Great Lakes.

To test how much ice these glaciers were losing, Gardner's team created a computer model and used climate data from 2004 to 2009. They noticed this dramatic loss of ice and called colleagues to confirm their findings.

A colleague from Oslo University in Norway, working with the ICESat, a NASA satellite that can measure elevation using a laser beam from space, confirmed Gardner's findings that the glaciers had been losing volume. A third team from the Netherlands, working with the GRACE satellite, a joint venture between NASA and the University of Texas, also confirmed the findings.

Source: Live Science

Belcher glacier, Devon Island, Nunavut, Canada.

ILLUSION FROM SPACE

What the heck is this?

Source: Live Science

If you guessed it's from an episode of "The Hole in the Wall," your experiencing an optical illusion.

While the image might seem to show a hole, it actually shows a lagoon within an atoll surrounded by an ocean, all viewed from space. The photo was taken by astronauts on the International Space Station.

Bassas da India is an uninhabited atoll in the Indian Ocean. It's made of volcanic rock surrounded by coral reefs, all 6 miles (10 kilometers) in diameter.

Sunlight glinting off the water is what creates the very unusual appearance. Darker patches and streaks are caused by currents in the water.

DID YOU KNOW?

What is a blind hole?

A blind hole refers to a hole that is reamed, drilled, or milled to a specified depth, thus without breaking through to the other side of the workpiece. The etymology is that it is not possible to see through a blind hole. Other types of holes also include through holes, and clearance holes. In this instance blind may also refer to any feature that is taken to a specific depth. More specifically referring to internally threaded holes (tapped holes).