

ON THE RECORD

“It would take somebody with real balls to say to Einstein, ‘Look, this is wrong.’”

A physicist praises Ernst Gabor Straus — a young colleague of Albert Einstein's, whose collection of correspondence with the legend will go on sale next month.

“I saw this ad that said ‘Get paid to stay in bed.’ I thought it was a scam.”

Erin Peterson tells how she came to spend three months lying down for a NASA bedrest study.

Sources: *Guardian*, *Seed*

SCORECARD

Spatial awareness
It turns out that NASA's DART mission failed last year because it accidentally accelerated into the satellite it was meant to be circling.

Whale songs
Anti-whaling activists launch a competition for the best music made from the remixed sound of singing whales.

Nazi researchers
A German scientist is ousted from the International Space Hall of Fame after revelations that he did experiments on prisoners in Dachau concentration camp.

Public image
The US National Science Foundation hires a public-affairs chief — former communications director for vice-president Dan Quayle. In 1991, Quayle was awarded the satirical Ig Nobel prize for “demonstrating, better than anyone else, the need for science education”.

NUMBER CRUNCH

Would you rather be fat or alive?
A survey of 4,300 people says...

25% of people would rather be unable to have children than obese.

30% would rather be divorced.

46% would rather give up a year of their life than be obese.

Source: Schwartz, M. B., Vartanian, L. R., Nosek, B. A. & Brownell, K. D. *Obesity* 14, 440–447; (2006).

ITER



Grand plan: a prototype reactor is poised to be built at Cadarache, but is there time to alter the design?

Physicists plead to make final tweak to fusion experiment

Just as scientists and engineers from seven nations put the finishing touches to their design for a multi-billion-dollar experiment, an idea comes along that could improve it. The dilemma facing those working on the international fusion reactor, known as ITER, is whether or not to incorporate the change.

ITER will cost roughly US\$6 billion to build — and aims to be the first fusion reactor to produce more power than it consumes. It will work by using a web of carefully constructed magnetic fields to suspend a plasma gas, which is heated to hundreds of millions of degrees.

A tweak to those fields is now being proposed, based on findings by plasma physicist Todd Evans and his team at General Atomics in San Diego, California. Evans's group successfully demonstrated a technique for preventing dangerous, lightning-like plasma discharges that could damage key parts of the reactor. These are caused when plasma builds up in the weakest areas of the magnetic field that contains it. “Think of squeezing a balloon of water — the balloon bulges out through your fingers,” says Evans. By modifying a reactor machine at General Atomics, called the DIII-D tokamak, the team made the rigid magnetic fields a little fuzzy — allowing excess plasma to gently leak away rather than bursting out. “In a sense, it's a beautiful concept,” Evans says.

The idea, which has been published in *Nature Physics* (T. E. Evans *et al.* *Nature Phys.* doi:10.1038/nphys312; 2006), could help ITER to succeed more quickly. But it comes at a cost: the technique would probably require expensive superconducting coils to be placed near or

inside the containment vessel, where space is limited and punishing radiation wears out equipment quickly.

ITER researchers are now mulling over how to work such a breakthrough into the design, which originated more than 20 years ago and has already been through several iterations. The change will have to wind its way through several review committees before receiving final sign-off by designers in the countries funding it: the United States, the European Union, Japan, the Russian Federation, India, China and South Korea. It will also compete with other ideas in the field that could help prevent violent disruptions in the machine or extend the time it can hold fusing plasmas.

Trying to get scientists and engineers to decide which changes to include in the final design and which to save for ‘upgrades’ isn't going to be easy, says Ned Sauthoff, a physicist at Princeton Plasma Physics Laboratory in New Jersey and head of ITER's US team.

“ITER is not just a physics experiment, it's also an experiment in large-scale project management.”

In the meantime supporters of the new concept will continue to conduct experiments, says Philippe Ghendrih, a theoretical physicist at the French Atomic Energy Commission in Cadarache, where further work is being done to integrate the idea into existing ITER designs. “If several other tokamaks can demonstrate the effect, then it will be easier to convince the engineers.”

A final design review will probably begin in the autumn, and should take about a year. ■

Geoff Brumfield

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