## SOUNDBITES

**"In the spirit of the Kyoto accord, we agreed to dress more lightly."**

Japan's finance minister, **Sadakazu Tanigaki**, on how government officials are helping to cut greenhouse emissions by taking off their jackets rather than turning up the air conditioning (*The Times*, London, 5 July)

**"I came here in desperation and they have treated me like a king."**

Businessman **Arthur Winiarski** after travelling from his home in Poland to Beijing to undergo the world's first officially licensed gene therapy for cancer (*The Sunday Telegraph*, London, 4 July)

**"I thought that my team was playing tricks on me and showing me a simulation of the rings and not the rings themselves."**

**Carolyn Porco**, leader of Cassini's imaging team, on the closest ever images of Saturn's rings (ABCNews.com, 2 July)

**"There are things generals should stay up late at night worrying about. A talking Coke can isn't one of them."**

**Paul Saffo** of the Institute for the Future on speculation that Coca-Cola's promotional soda cans equipped with cellphones and GPS chips might be used to leak classified information (Associated Press, 2 July)

**"Nothing but the ankles of the giraffe were visible when I went out there. I'm sure he smelt that fresh, cool water bubbling up and couldn't resist it."**

Veterinarian **Tyler Thomas** of the Louisiana Purchase Gardens & Zoo explains why a 5-metre giraffe drowned after tumbling headfirst into a sinkhole that opened up when a water main burst in the zoo (Associated Press, 4 July)

# A table-top test for dark energy?

MARCUS CHOWN

THE nature of dark energy, the mysterious stuff that is relentlessly pushing the universe apart, could be revealed by a simple table-top experiment.

Physicists dreamed up dark energy in 1998, when they found that distant supernovae appeared fainter than expected, showing that they were farther away than previously thought. To explain this, they concluded that the expansion of the universe must be accelerating and that dark energy was responsible.

One possible origin for dark energy arises from a prediction made by quantum physics: that the vacuum of space is a choppy sea of "quantum fluctuations". This quantum vacuum could be the source of dark energy.

The effects of the quantum vacuum have already been observed in a device known as the Josephson junction, an extremely thin layer of insulator sandwiched between two superconducting layers. Josephson junctions have the curious property of being able to contain a varying current even in the absence of an external voltage and in 1982, Roger Koch and colleagues, then at the University of California, Berkeley, and the Lawrence Berkeley Laboratory, showed that the jitter of the quantum vacuum could cause high-frequency fluctuations in the varying current within the Josephson junction.

Now Christian Beck of Queen Mary University of London and Michael Mackey of McGill University in Montreal, Canada, have pointed out that if the quantum vacuum and dark energy are the same, then the fluctuations in a Josephson junction should peter out at frequencies above about 1700 gigahertz. Koch's team originally measured these fluctuations up to a frequency of 600 gigahertz. "So it is necessary only for someone to improve on his experiment by a factor of 3," says Beck.

If such an experiment showed no cut-off in the frequency of fluctuations in the Josephson junction, the energy density in the fluctuations will exceed the density of dark energy observed in the universe. And since the fluctuations in the device are caused by quantum vacuum, this will mean that quantum vacuum is not the source of dark energy. "We will have made some progress, but the mystery of what the dark energy is will have deepened," says Beck. But if the fluctuations do cut off at the predicted frequency, this would strongly support the idea that the quantum vacuum is the source of dark energy.

"It would be wonderful if a table-top experiment would help in the search for dark energy," says Michael Doran of Dartmouth College in New Hampshire. But he points out that such cut-offs have not been seen in measurements of a related phenomenon known as the Casimir effect, which is a small attractive force that arises due to the quantum vacuum between two parallel and uncharged conducting plates just hundreds of nanometres apart. "Then again, experiments have always been good for surprises," he says. ●