That is, according to quantum theory, a large object could be in two quantum states at the same time. It is not just for subatomic particles.

Everyday experience, of course, indicates that big objects behave classically. In special labs and with a lot of effort, we can observe the quantum properties of photons or electrons. But even the best labs and greatest efforts are yet to find them in anything approaching the size of a cat.

Could they be found? The question is more than head-in-the-clouds philosophy. One of the most important experimental questions in quantum physics is whether or not there is a point or boundary at which the quantum world ends and the classical world begins.

A straightforward approach to clarifying this question is to experimentally verify the quantum properties of ever-larger macroscopic objects. Scientists find these properties in subatomic particles when they confirm that the particles sometimes behave as a wave, with characteristic peaks and dips. Likewise, lab set-ups based on the principle of quantum interference, using many mirrors, lasers and lenses, have successfully found wave behaviour in macromolecules that are more than 800 atoms in size.

Other techniques could go larger. Called atom interferometers, they probe atomic matter waves in the way that conventional interferometers measure light waves. Specifically, they divide the atomic matter wave into two separate wave packets, and recombine them at the end. The sensitivity of these devices is related to how far apart they can perform this spatial separation. Until now, the best atomic interferometers could put the wave packets about 1 centimetre apart.

On page 530 of this issue, physicists demonstrate an astonishing advance in this regard. They show quantum interference of atomic wave packets that are separated by 54 centimetres. Although this does not mean that we have an actual cat in a state of quantum superposition, at least a cat could now comfortably take a nap between the two branches of a superposed quantum state. (No cats were harmed in the course of these experiments.)

Making huge molecules parade their wave nature and constructing atom interferometers that can separate wave packets by half a metre are extraordinary experimental achievements. And the technology coming from these experiments has many practical implications: atom interferometers splendidly measure acceleration, which means that they could find uses in navigation. And they would make excellent detectors for gravitational waves, because they are not sensitive to seismic noise.

"A cat could now take a nap between the two branches of a superposed quantum state."

Schrödinger was more of a philosopher than an engineer, so it is plausible that he would not have taken that much interest in the practical ramifications of his theory. However, he would surely have clapped his hands at the prospect that experimenters could one day induce large objects to have quantum properties. And there are plenty of proposals for how to ramp up the size of objects with proven quantum behaviour: a microscopic mirror in a quantum superposition, created through interaction with a photon, would involve about 10^{14} atoms. And, letting their imaginations run wild, researchers have proposed a method to do the same with small biological structures such as viruses.

To be clear, science is not close to putting a person or a cat into quantum superposition. Many say that, because of the way large objects interact with the environment, we will never be able to measure a person's quantum behaviour. But it's Christmas, so indulge us. If we could, and if we could be aware of such a superposition state, then how would we feel? Because 'feeling' would amount to measuring the wave function of the object, and because measuring causes the wave function to collapse, it should really feel like, well, nothing — or perhaps just a grin. ■

Light relief

Nature digs into the rumours about the effect of festive illuminations on wireless fidelity.

At the end of the year, it is natural to reflect on the many science success stories of 2015. There was the forging of a climate-change agreement in Paris, and the incredible pictures of Pluto beamed back by the New Horizons spacecraft (for more, see our end-of-year review starting on page 448). Beware, though, for the road of progress is bumpy, and new and old technology can clash.

Christmas can break the Internet, the UK newspapers nearly reported this month. Researchers have found that twinkling fairy lights on a household Christmas tree can interfere with the wireless signal between a router and internet-connected devices.

In Britain, the telephony and airwaves regulator Ofcom released a smartphone app so that people can assess just how bad this seasonal effect is. We at *Nature* know what's expected of us, so we downloaded the app and put it through its paces.

First, the control test. The Nature Towers Wi-Fi was just fine before we illuminated the office Christmas tree, and — to the relief of all — remained completely unaffected once the halls were decked with the requisite tinsel, mistletoe, boughs of holly and festive lighting. Still, before you eat another mince pie and check the online weather forecast for snow, know that the Wi-Fi was seriously compromised by unknown forces once the illuminations had been switched off for the night. What could have been going on?

As Andrew Smith writes on *The Conversation*, your festive illuminations might indeed interfere with your Wi-Fi, but they would have to very powerful — much more so than other household features such as microwaves or fluorescent lights (see go.nature.com/fqy5mr).

The *Daily Mail* newspaper can always be relied on for inventive scientific answers and did not disappoint. Perhaps, it says, goldfish are sabotaging the Wi-Fi? Water, it points out, absorbs radio waves, so you shouldn't place a router near a fish tank, nor (we suppose) in one.

The story, although little more than a sprinkling of seasonal fluff on the tail end of the year in science, does illustrate more serious matters — the many factors, perhaps small and even undetectable, that can throw an experiment.

We all know colleagues whose Southern blots come out like Rorschach tests and who have to rely on the one lab technician who has 'the touch'. *Nature* argues strongly for reproducibility and that experimental details, no matter how small, should be set out for all to see. We have launched a string of publications and platforms to help researchers to do this: *Nature Methods*, *Nature Protocols*, *Scientific Data* and *Protocol Exchange*. However, when one is working just beyond the cutting edge, other factors might be at play — on the edge of detectability and beyond. One of last year's highlights was the discovery, after years of careful testing, that migrating birds can be disoriented by the electromagnetic 'smog' produced by human activity (S. Engels *et al. Nature* **509,** 353–356; 2014).

This finding sits in a contentious field in which researchers seek to explain the seemingly impossible feat in which animals detect and transduce the very weak signals generated by Earth's magnetic field. Festive bulbs are a mere drop in the electromagnetic ocean, from the devices around us to the photons that bring messages from the edge of the cosmos.

In the time it has taken you to read this, about 600 trillion neutrinos will have passed through your body, as well as uncounted dark-matter particles, and perhaps even some schleptons, snoozons, axions and other particles of which science has as no knowledge, yet. That is what next year is for. ■

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