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SCARBOROUGH



Right on cue: it's beginning to look a lot like winter

A blanket of snow fell over parts of the country yesterday as forecasters warned of travel disruption (Will Humphries writes). St Andrew's Day took

on a festive appearance across large parts of the east coast of England and northern Scotland, and there was a risk of ice in west Wales, Cornwall and much of Northern Ireland. A flurry of snow fell in London, while 19

schools in Aberdeenshire were closed. Up to 5cm of snow accumulated on ground above 100m in some northern areas. Police warned drivers to beware of icy roads as the Met Office said that last night could be the

coldest since last winter, with temperatures potentially falling below the -6.3C recorded in Topcliffe, North Yorkshire, on November 25. It said that there could be icy stretches on untreated roads,

pavements and cycle paths this morning.

Helen Roberts, a forecaster, added: "More widely temperatures are likely to be between minus 4C and 2C so it will be a frosty start and there will be icy

stretches. We are likely to see further warnings for ice."

Central England is expected to experience cold sunshine today, with wintry showers in the east and north. Full forecast, page 67

MELTON MOWBRAY



NORTH YORK MOORS



Time really can flow backwards ... but don't blink or you'll miss it

Oliver Moody Science Correspondent

"If I could turn back time," Cher once sang. "If I could find a way, I'd take back those words that hurt you."

If only she were a sub-atomic particle, science would have the answers to all her problems. Physicists have discovered that time can flow backwards of its own accord, albeit for a brief instant and on an extremely small scale.

While nobody is about to build a time machine on the strength of the findings, they demonstrate that the quantum world is capable of disobeying one of the most fundamental rules of nature as we experience it in our daily lives.

Ninety years ago the British astronomer Arthur Eddington came up with an idea known as the "arrow of time". The only reason for time running in one direction from past to future, he believed, was that some physical pro-

cesses were irreversible. It is very easy to scramble an egg and all but impossible to unscramble it again. In a similar way, the second law of thermodynamics says that all the energy in an isolated system — whether it be a car engine or the entire universe — must even out into randomness over time. There is no going back.

In practice, this means that heat should never pass from a cold object to a warm one if the two are left to their own devices. If it did so, it would effectively turn the passage of time back to front, like using an ice cream to heat up an oven. Yet that is exactly what researchers have seen going on.

The scientists linked two bundles of quantum particles, known as qubits, in such a way that they shared the same spin, a measure of their magnetic moment. As this link broke down, thermal energy moved from the chillier qubit to the hotter one, reversing the arrow of

time. Roberto Serra, associate professor of quantum technology at the Federal University of ABC in Brazil and one of the paper's senior authors, said it was the first time that scientists had seen this happening spontaneously.

It is not that the laws of physics have been broken; it is more that they do not always apply to quantum particles, which appear to be able to swim against the current of time.

"In our experiment we have verified that the concept of the arrow of time can be relative," Professor Serra said. "It points in one direction for the experimental system, and in the opposite direction for all the systems surrounding it."

He suspects that the information contained in the bond between the two qubits is consumed as a kind of quantum "fuel" that provides the heat current. Writing on Arxiv.org, a physics website, his team said that there was no

reason why this effect could not work on larger scales.

It is vanishingly unlikely that you could fit an object as large as a cat or a person through this loophole, however. Mauro Paternostro, a physicist at Queen's University Belfast who was not involved with the study, said that it was "fully credible and interesting".

"Under normal conditions, heat goes from hot to cold, which implies that ordered systems become more disordered," he said. "This sets the direction of the arrow of time. Processes evolve so as to make ordered systems chaotic."

"However... If we change [the relatedness of certain particles], as the researchers did by starting with a quantum-correlated system, you will revert the direction of the arrow of time. Heat will go to the warmer system and disordered systems will become more ordered: weird, but fundamentally correct."

Police hunt rush-hour sex attacker

John Simpson Crime Correspondent

The same man is responsible for sexual assaults on 25 women and girls over the past 13 months, police said yesterday.

Detectives investigating the campaign of abuse across south London say that a blue-eyed, blond white man in his forties has been attacking lone victims aged between eight and 35. The man has been called the "rush-hour sex attacker" because the assaults are usually carried out during the morning or afternoon commute.

Officers have released CCTV footage showing the man appearing to grope



The blond man has attacked at least 25 girls and women

one 15-year-old girl in southeast London on November 22.

In the first attack a 13-year-old girl was sexually assaulted in Orpington on October 16 last year. On October 5 he attacked three victims aged 13, 25 and 27 within 35 minutes of each other in Blackheath. He also attacked an eight-year-old girl on her way to school in Brockley, southeast London, and committed attacks in Lewisham, Greenwich, Southwark, Bromley and Bexley.

Detective Chief Inspector Andrew Furphy said: "These offences have been traumatic for the victims, all of whom have been young females going about their daily lives."

Any victims who have not yet come forward are urged to contact police.

Boy, 5, drowned after parents left him for hours

George Sandeman

A five-year-old boy who could not swim was found drowned at the bottom of a pool by other children after his parents left him unsupervised for two hours at a water park, a court heard.

Charlie Dunn was discovered by three children, aged 10 and 11, who felt him underneath their feet while they searched for goggles in a pool that was 1.4m (4.5ft) deep at Bosworth Water Park in Leicestershire.

His stepfather, Paul Smith, 36, was

allegedly heard saying: "For f***'s sake, we're ready to go. I don't know where he f***ing is" as he and Charlie's mother, Lynsey Dunn, 28, were preparing to leave the park.

The jury at Birmingham crown court heard that Charlie, from Tamworth in Staffordshire, was allowed to "go off by himself" on July 23 last year.

Mr Smith and Ms Dunn both deny causing his death by gross negligence by allowing him to enter the bathing area unsupervised. Ms Dunn told police she thought Charlie would have



Charlie Dunn had no buoyancy aids and was said to be terrified of water

informed her if he was going into the water, which he was "terrified" of.

Mr Smith also denies a charge of attempting to intimidate a witness.

Mary Prior, QC, for the prosecution, said Charlie, who did not have buoyancy aids, arrived at the pool at 12.25pm and was pulled out of the water at about 2.45pm. She said: "This is a gross failure to supervise not for seconds, and not for a few minutes, but for protracted periods of time in circumstances where the child was exposed to danger."

The trial continues.