Lab

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Avoiding second big bang a matter of... more matter

WHEN matter first formed in the universe it should have been joined by antimatter – which would have annihilated both.

Now we may know the reason why it didn't blow up the universe.

Ghostly particles called neutrinos and their antimatter counterparts come in three varieties – electron, muon and tau – which they can switch between.

The T2K experiment in Japan looks both at muon neutrinos and their antimatter version to see if there is a difference in their rates of change. A principle called charge-parity (CP) symmetry holds that they should be the same.

However, Patricia Vahle who works on NoVA, a US experiment similar to T2K, said: 'We know in order to create more matter than antimatter in the universe, you need a process that violates CP symmetry.' The latest results from T2K include 32 sightings of muon

neutrinos morphing into the electron flavour, compared with just 4 muon anti-neutrinos becoming the anti-electron variety.

This is more matter and less antimatter than expected, assuming CP symmetry holds.

It is still early days, and NoVA plans its own tests next year, but one of the mysteries of why we are here could soon be solved.

FEEL YOUR OUTER

Trick with a rubber hand reveals our own personal 'buffer zone'

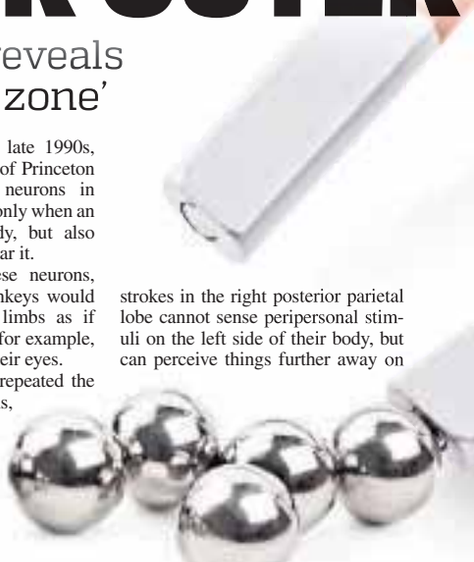
OUR brains are aware not just of our bodies but also the immediate space around us. Now, an illusion using a rubber hand has let people 'feel' this space – a sensation they liken to perceiving a 'force field'.

Our brains contain representations of the area surrounding us, known as peripersonal space. This allows us to grasp objects within our reach and helps to protect us.

For example, imagine you are walking through the woods when a low-hanging branch suddenly appears in your peripheral vision. You'll instinctively duck to dodge it: your sense of peripersonal space has helped you avoid being hit. In the late 1990s, Prof Michael Graziano, of Princeton university, found that neurons in monkey brains fired not only when an object touched the body, but also when the object came near it.

Upon stimulating these neurons, they found that the monkeys would move their heads and limbs as if defending themselves – for example, grimacing and closing their eyes.

Although no one has repeated the experiments in humans, there is evidence that certain regions of our brains deal specifically with peripersonal space. For instance, some people who have strokes in the right posterior parietal lobe cannot sense peripersonal stimuli on the left side of their body, but can perceive things further away on



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