

New Scientist

WEEKLY 29 June 2024

IMMUNE TO CORONAVIRUS
We finally know why some
people don't get covid-19

QUANTUM QUIRK
How to create energy
from nothing

APE APOTHECARY
Sick chimps choose plants
to heal themselves

SPECIAL ISSUE

OUR COSMIC PERSPECTIVE

The biggest questions about the
universe and our place in it

IS THE UNIVERSE INFINITE? / WHERE DO SPACE AND TIME COME FROM? /
ARE WE ALONE? / HOW CAN WE RECKON WITH OUR INSIGNIFICANCE? /
IS THE COSMOS CONSCIOUS? / IS OUR UNIVERSE THE ONLY ONE?
...AND MUCH MORE

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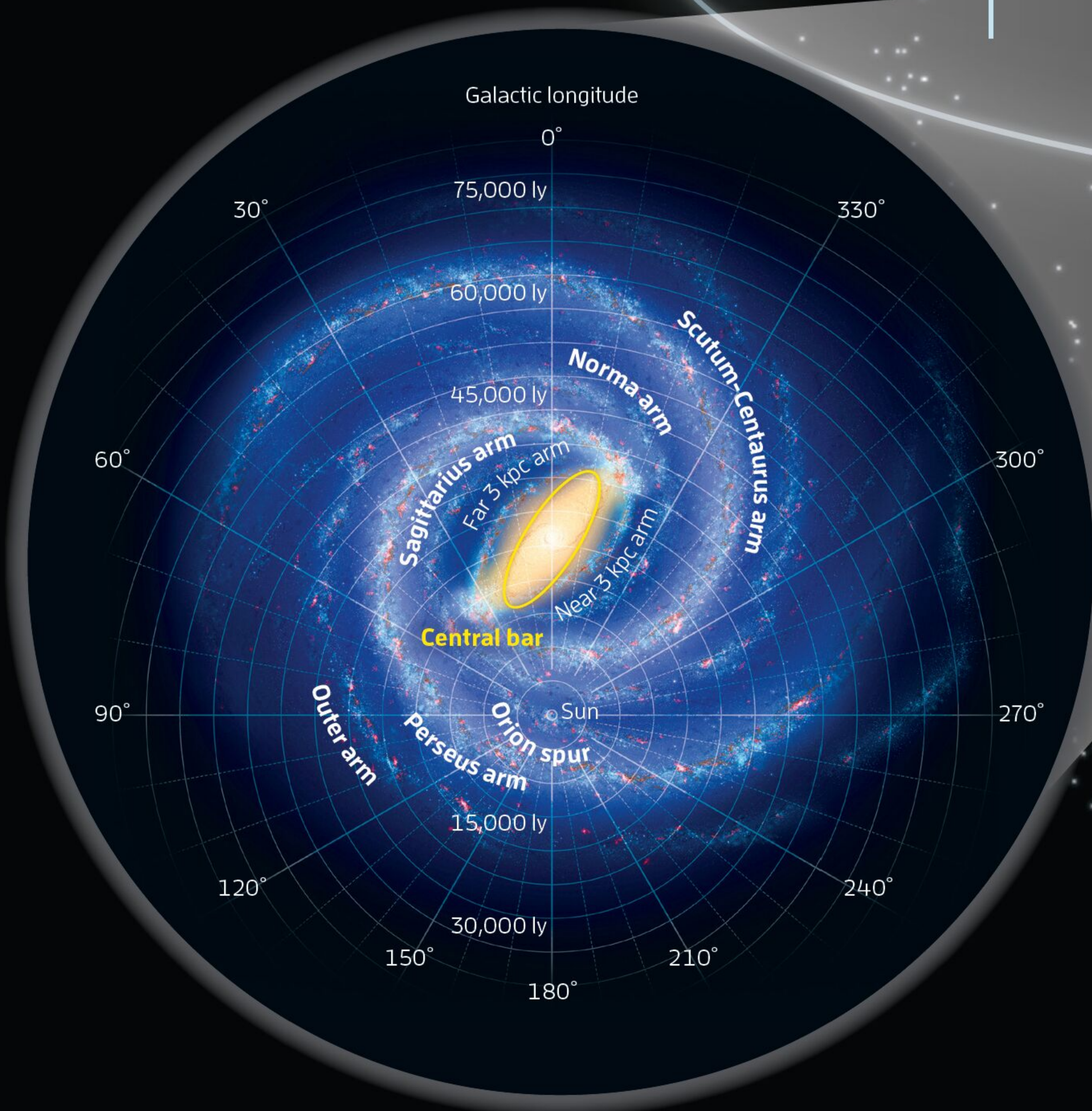
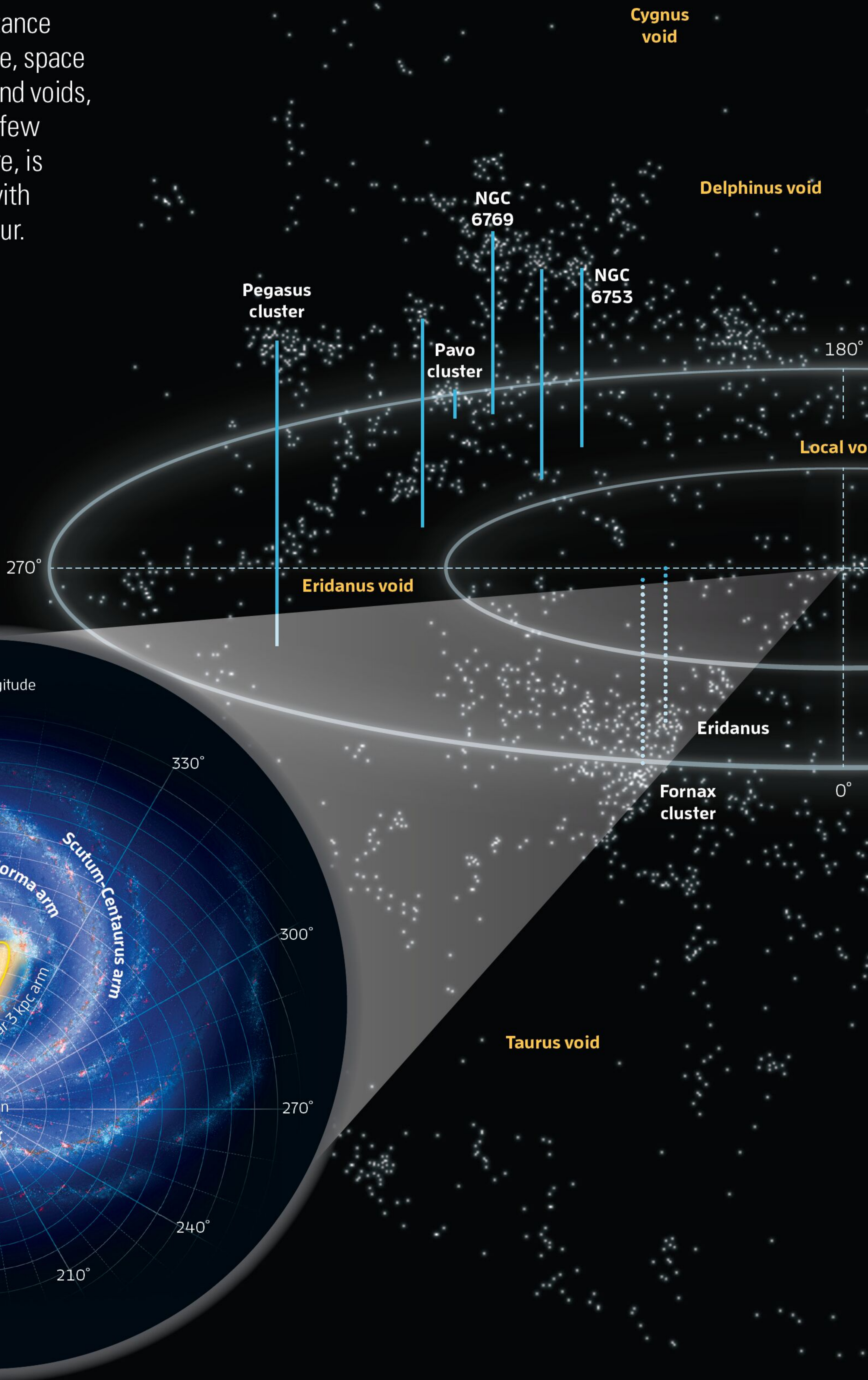


YOU ARE HERE

This map shows the circle of the cosmos that surrounds us, extending to a distance of 200 million light years. At this scale, space is comprised of clusters of galaxies and voids, the latter being areas with relatively few galaxies. The Milky Way, at the centre, is part of the Local Group of galaxies, with the Virgo cluster our nearest neighbour.

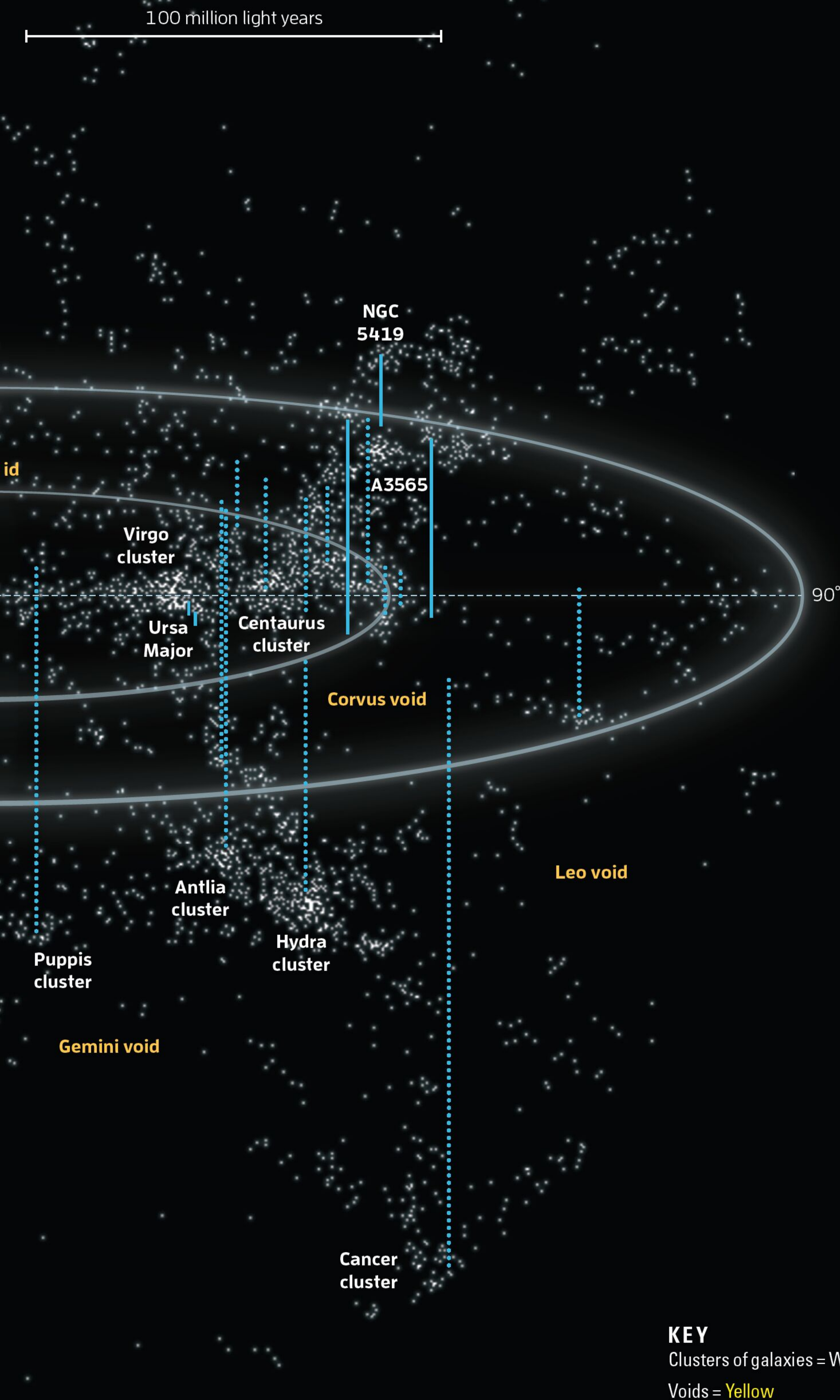
MAJESTIC SPIRAL

The Milky Way's spiral structure is dominated by two main arms called Scutum-Centaurus and Perseus. It also features a dense region known as the central bar. Our solar system lies on a more modest structure called the Orion spur.



2 trillion

Upper estimate for the number of galaxies in the universe



Where are we in the universe?

However tangled the question of our metaphorical place in the universe, we can use astronomy to grasp Earth's physical location.

Earth orbits the sun at a distance of 150 million kilometres and the sun orbits the centre of the Milky Way. Specifically, we are in the Orion arm, around 26,500 light years from the centre (see "Majestic spiral", far left).

The Milky Way resides in the Local Group of galaxies. About 2.5 million light years away is our closest neighbouring galaxy, Andromeda, the largest galaxy in the Local Group. Right now, we are hurtling towards Andromeda at more than 100 kilometres per second; in about 4 billion years, the two galaxies will collide.

That will shake up the Local Group, but it will be barely a blip on the radar of the wider cosmic neighbourhood. The Local Group is on the outskirts of the Virgo supercluster, the larger structure named after our next-door Virgo cluster. The Virgo supercluster itself is one of four parts of an even larger supercluster called Laniakea, which contains about 100,000 galaxies. All of that resides at the centre of the observable universe, which may or may not extend far beyond what we can view (see "How big is the universe, really?", page 31).

There are limits to how well we can orient ourselves, though. There is no way for us to meaningfully move from our place in the universe and observe it from any other perspective. Naturally, that means there are things we can never see. For example, the Milky Way's centre is teeming with stars and dust that obscure about 20 per cent of the sky, an area known as the Zone of Avoidance (or, more accurately, the Zone of Galactic Obscuration). There are ways to peer through this zone, such as observing in radio wavelengths, but a huge swathe of the sky remains blocked out, even to the most powerful telescopes.

There are around 10 million superclusters in the observable universe, at least hundreds of billions of galaxies. We can't possibly study all of them, but we can get a taste of their dazzling diversity in our own humble corner of it.

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