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Space

JWST images show a nebula shaped by a multi-star system

Leah Crane



JOSEPH DEPASQUALE (STSC)/NASA/ESA/CSA

THE Southern Ring Nebula is full of stars. It was once thought that nebulae, huge clouds of gas and debris in space, were created from the death of a single star, but we know now that this one's swoops and whorls were formed by at least four stars orbiting one another – maybe even five.

Orsola De Marco at Macquarie University in Australia and her colleagues viewed the nebula, also called NGC 3132, using the James Webb Space Telescope (JWST), and created a three-dimensional model to figure out its internal structure.

“Ideally you would find the companion stars and wind back time,” says De Marco. “In practice you can’t do that, so you have to work like an investigator at the crime scene where the nebula itself is telling you what happened to it.”

When a star about the size of the sun dies, it sheds its outer layers and the stellar core heats them and makes them glow.

Previously, we knew there were two other stars orbiting the main star that created the

Southern Ring Nebula, one nearby and one distant. The JWST images revealed a disc of dust around the primary star that must be caused by an additional companion star, orbiting even closer than the closest one we knew about – about the distance between Earth and the sun. We see no sign of the star itself, so it may have fallen in and merged with the primary star.

“The nebula’s swoops and whorls were formed by at least four stars orbiting one another”

The outer edges of the nebula also show a series of arches that look a bit like the rings in a tree stump. The spacing of these rings allowed the researchers to calculate the distance between the primary star and the star that carved them into the expanding gas cloud, which must be 40 to 60 times more distant than the star that created the disc of dust (*Nature Astronomy*, doi.org/grgnmz).

“Every time we’ve had rings

Two JWST images of the Southern Ring Nebula

like this, the only explanation that really works is that there is a companion around the star when the star is shedding, and as it orbits it imprints a track into the material,” says De Marco. “You need a companion to make the rings, but it cannot be the same companion that made the disc.”

Finally, the 3D model of the nebula revealed evidence of what may be a fifth star. The reconstruction looks a bit like a lumpy egg, and each bump is paired with another on the opposite side of the gas cloud.

These lumps are most likely formed by jets from the central star, but the only way to give them their seemingly random orientations would be through the chaotic orbits of three nearby stars. That would require an additional star orbiting the primary star and the extremely nearby one that made the disc of dust, making the Southern Ring a stellar quintet. ■

Anthropology

Milk may have fuelled growth spurt in ancient Europe

Luke Taylor

THE evolution of lactose tolerance may explain why people in northern and central Europe increased in size between 7000 and 4000 years ago, while people elsewhere stayed the same height or got smaller.

To examine how human body size has changed, Jay Stock at Western University in Ontario, Canada, and his colleagues collated data on 3507 skeletons from 366 archaeological sites in seven regions stretching back to 30,000 years ago. They used skeletal measurements to estimate each individual’s height and the size of weight-bearing joints to estimate their weight.

They found that the global mean height for men and women declined from 30,000 years ago onwards, reaching its minimum between 8000 and 6000 years ago. However, in central Europe, stature rose between 7000 and 4000 years ago, while in northern Europe, it increased between 8000 and 2000 years ago. Similar trends were seen for body mass (*PNAS*, doi.org/grnn67).

The earliest evidence of dairy production is from around 9000 years ago in western Asia, from where it spread around the world, reaching central Europe at least 7400 years ago.

The authors theorise that the exceptional growth resulted from those European peoples producing the enzyme lactase into adulthood, which allowed them to gain more nutrition from lactose, a sugar found in milk. But the study found that people in Britain got smaller in the same period, despite being early milk drinkers.

“I see no systematic, numerical analysis to suggest it is much more than a guess that selection was stronger on lactase at this time when we see increases in body mass,” says Mark Thomas at University College London. ■