

News & Comments

Spiral Protostellar Disk Found in Milky Way's Centre

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A massive protostellar disk in the Galactic Center and its spiral arms have been discovered using high-resolution data from the Atacama Large Millimeter/submillimeter Array (ALMA).

The accretion disk, or protostellar disk, is a key component in star formation. Protostars receive gas from the environment continuously through these disks. As stellar cradles, they nurture and birth stars. It surrounds an early O-type star about 32 times the mass of the Sun with a diameter of 4,000 astronomical units.

There are two spiral arms visible on the disk, which is even more interesting. Protostellar disks rarely have spiral arms like those found in spiral galaxies. Accretion disks can form spiral arms as a result of fragmentation induced by gravitational instabilities. Although hot and turbulent, this disk can balance its gravity because it is hot and turbulent.

At the Galactic Center, on the other hand, there is tremendous turbulence, magnetic fields, and tidal forces from Sgr A*, which all have a profound impact on star formation. Due to the distance between the Galactic Center and Earth and complex foreground contaminations, direct studies of star-forming areas near the Galactic Center have proven challenging.

Flybys can dramatically alter the evolution of stars and planets in the early phases of star formation due to frequent dynamic events such as accretion disks. The solar system may have also experienced flybys. Scholz's Star is thought to have penetrated the Oort cloud around 70,000 years ago and delivered comets to the inner solar system.

This study not only offers the first direct images of a protostellar disk in the galactic centre but also indicates that external objects can whip stellar disks into spiral shapes normally seen only in galaxies.

There may be a vast number of miniature spirals in our galaxy's centre, just waiting to be discovered. It may take scientists a long, long time to reach the centre of this cosmic nesting doll.

KEYWORDS

astrophysics, accretion discs, spiral galaxies, solar system formation, ALMA, Galaxy, Milky Way, O-type star, Protostar, Protostellar disk, Sagittarius A*, Sagittarius C, Spiral arm, Star, Star formation

