A group of international astrophysicists have identified cloud bands on the surface of Luhman 16A, one of a pair of binary brown dwarfs in the Vela constellation.

They have used an idea put forth by Indian astrophysicist Sujan Sengupta, who is at the Indian Institute of Astrophysics, Bengaluru, that the light emitted by a cloudy brown dwarf, or reflected off an extrasolar planet, will be polarised.

He suggested that a polarimetric technique could serve as a potential tool to probe the environment of these objects.

Subsequently, many astronomers detected polarisation of brown dwarfs. But what is special in the newest study of Luhman 16 is that the researchers have found the actual structure of the clouds — that they form bands over one of the pair (Luhman 16A) of brown dwarfs.

Luhman 16A

Luhman 16 is a binary star system, the third closest system to the Sun after Alpha Centauri and Barnard's star.

At a distance of about 6.5 light years from the Sun, this pair of brown dwarfs referred to as Luhman 16A and Luhman 16B orbit each other, casting a dim light.

Brown Dwarfs

Brown dwarfs are objects which have a size between that of a giant planet like Jupiter and that of a small star. In fact, most astronomers would classify any object with between 15 times the mass of Jupiter and 75 times the mass of Jupiter to be a brown dwarf.

Given that range of masses, the object would not have been able to sustain the fusion of hydrogen like a regular star; thus, many scientists have dubbed brown dwarfs as "failed stars".

Starting in 1995, astronomers have been able to detect a few nearby brown dwarfs. All of the brown dwarfs discovered so far are parts of a binary system. A binary system is one in which two stars orbit around one another (just like the planets of our solar system orbit our star, the Sun).

It is believed that some of the more massive brown dwarfs fuse deuterium or lithium and glow faintly.

The faintness of the glow proved to be providential in finding the cloud bands. Unlike a star whose brightness would be too high, or an extrasolar planet orbiting a star, where the extra light from its star would have to be cut off to make the measurement, the light of the brown dwarfs was just right.

The group, by using the Very Large Telescope at European Southern Observatory, Chile, found that Luhman 16A had band-like clouds in its atmosphere, whereas the same was not true...
of Luhman 16B.