

INITIAL STAR FORMATION

There are areas in space in which reside huge volumes of low temperature, high density gasses of atomic stuff. These areas are called “molecular clouds.” Because these areas are very low temperature, gravity can overcome the outward pressures that come with the gravitational collapse of matter, and a star can form.

Molecular clouds with mass's between 10,000 and 1,000,000 times that of the sun are called “giant molecular clouds” (gmc's).

These structures can cover 10's of parsecs and have densities of 100 to 1000 particles per cubic centimeter (versus normal space where the mass density is around 1 particle per cubic centimeter).

The cores can be even denser with densities of 10,000 to 1,000,00 particles per cubic centimeter (versus normal space where the mass density is around 1 particle per cubic centimeter).

Stellar nursery:



Stellar Nursery

NASA's Spitzer Space Telescope captured a glowing stellar nursery within a dark globule that reveals the birth of new protostars, or embryonic stars, and young stars never before seen.

The Elephant's Trunk Nebula is an elongated dark globule within the emission nebula IC 1396 in the constellation of Cepheus. Within the globule, a half dozen newly discovered protostars are easily discernible as the bright red-tinted objects, mostly along the southern rim of the globule. These were previously undetected at visible wavelengths due to obscuration by the thick cloud ('globule body') and by dust surrounding the newly forming stars. The newborn stars form in the dense gas because of compression by the wind and radiation from a nearby massive star (located outside the field of view to the left). The winds from this unseen star are also responsible for producing the spectacular filamentary appearance of the globule itself, which resembles that of a flying dragon.

Image credit: NASA/JPL-Caltech/W. Reach (SSC/Caltech)

From the Hubble telescope:







Within a few million years the light from bright stars will have boiled away this molecular cloud of gas and dust. The cloud has broken off from the [Carina Nebula](#). Newly formed stars are visible nearby, their images reddened by blue light being preferentially scattered by the pervasive dust. This image spans about two light-years and was taken by the orbiting Hubble Space Telescope in 1999.



Composite image showing young stars in and around molecular cloud Cepheus B.