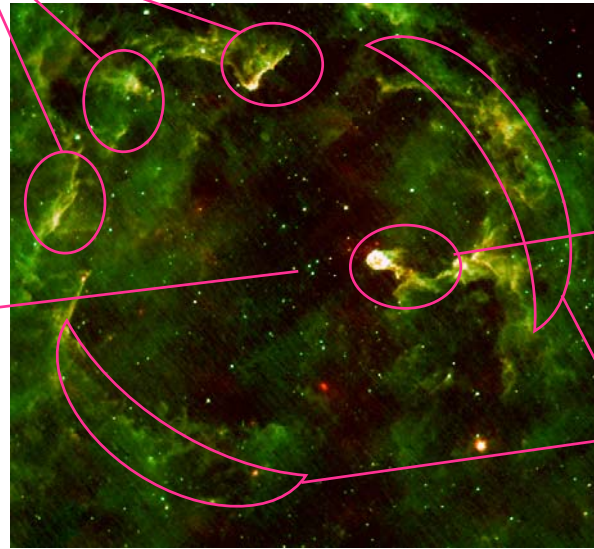


# Mid-Infrared Image of IC 1396

Appendix

New stars are born in the dense regions of swept out gas.

Massive young stars recently born blow out the gas in the central region of the nebula.



“Elephant Trunk Nebula”

Gas and dust are swept out from the central region forming a shell-like structure.

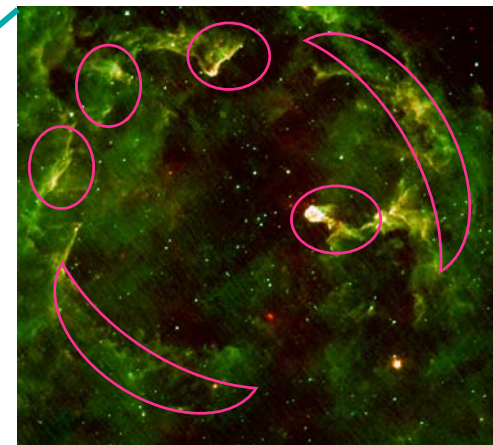
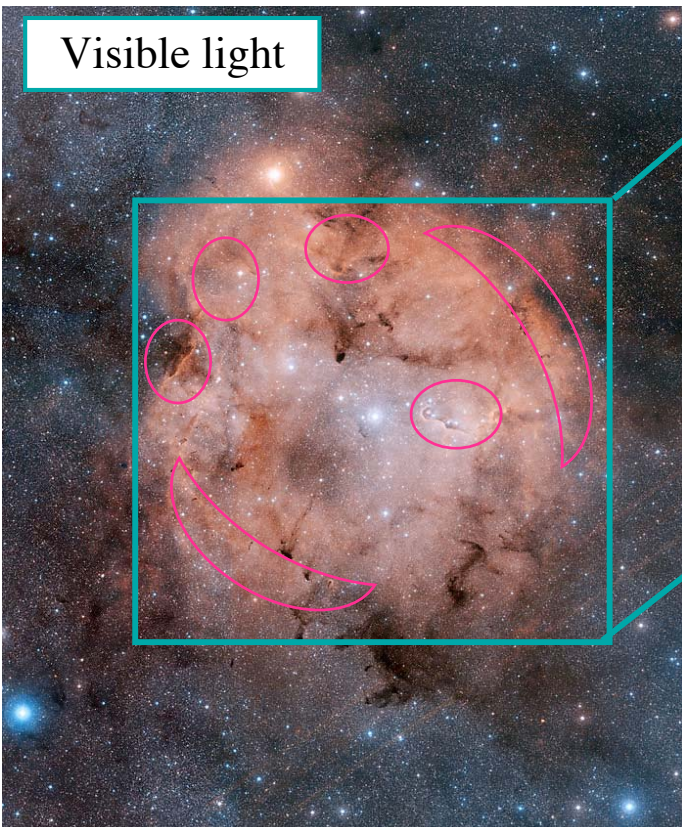
← About 100 light years →

Massive young stars, recently born in the centre of the image, blow out the interstellar gas and dust creating the giant hollow seen in the central region. The gas that has been swept out creates the bright fillament-like structures seen in the surrounding regions. Dust in the gas is heated by the intense light from both the massive star at the centre of the nebula, and the newly born stars in the dense swept-up gas itself and emits infrared light. The bright clump seen on the slightly off-centre right-hand side is known as the “Elephant Trunk Nebula”. This object would manifest itself as a dark nebula in the visible light but is conversely very bright in the infrared. It is a clump of dense gas that was not originally blown away because of its very high density. Stars are also being formed within this region.

## Comparison with the visible light image of IC 1396

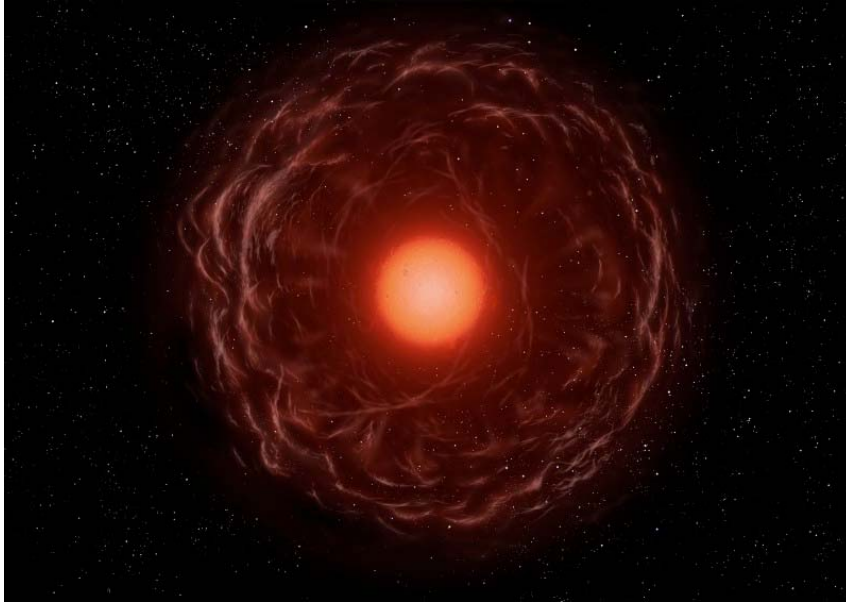
Visible light

AKARI

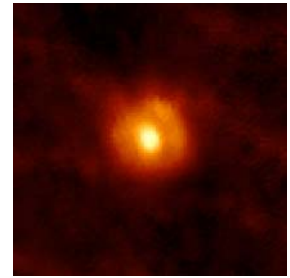


In the visible light we see emission from ionized Hydrogen gas as well as scattered light from the massive stars in the centre by the interstellar dust. High density gas clumps are seen as dark stains. When new stars are born in these dark regions, they appear bright when observed in the infrared light.

## A red-giant star ejecting matter (artist's impression)



AKARI image of U Hydrae



Stars with masses close to our Sun become “red-giant” stars in the later stages of their lives. The radius of a red-giant star expands to a size comparable to the orbit of the Earth, and the matters at the surface of the star flows out and escapes. The picture shows an artist impression of such a red-giant star. Dust is formed in the out-flowing gas when the temperature decreases. This mixture of gas and dust is blown away by the light from the central star, and expands into space. The dust cloud seen in U Hydrae was formed about 10,000 years ago by a temporal intense mass ejection and has expanded to about 0.3 light year at the present time.