

The ghost of Cassiopeia

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Credit: NASA, ESA

About 550 light-years away in the constellation of Cassiopeia lies IC 63, a stunning and slightly eerie nebula. Also known as the ghost of Cassiopeia, IC 63 is being shaped by radiation from a nearby unpredictably variable star, Gamma Cassiopeiae, which is slowly eroding away the ghostly cloud of dust and gas. This celestial ghost makes the perfect backdrop for the upcoming feast of All Hallow's Eve—better known as Halloween.

The constellation of Cassiopeia, named after a vain queen in Greek mythology, forms the easily recognisable "W" shape in the night sky. The central point of the W is marked by a dramatic star named Gamma Cassiopeiae.

The remarkable Gamma Cassiopeiae is a blue-white subgiant variable star that is surrounded by a gaseous disc. This star is 19 times more massive and 65 000 times brighter than our Sun. It also rotates at the incredible speed of 1.6 million kilometres per hour—more than 200 times faster than our parent star. This frenzied rotation gives it a squashed appearance. The fast rotation causes eruptions of mass from the star into a surrounding disk. This mass loss is related to the observed brightness variations.

The [radiation](#) of Gamma Cassiopeiae is so powerful that it even affects IC 63, sometimes nicknamed the Ghost Nebula, that lies several light years away from the star. IC 63 is visible in this image taken by the NASA/ESA Hubble Space Telescope.

The colours in the eerie nebula showcase how the nebula is affected by the powerful radiation from the distant star. The hydrogen within IC 63 is being bombarded with ultraviolet radiation from Gamma Cassiopeiae, causing its electrons to gain energy which they later release as hydrogen-

alpha radiation—visible in red in this image.

This hydrogen-alpha radiation makes IC 63 an emission nebula, but we also see blue light in this image. This is light from Gamma Cassiopeiae that has been reflected by dust particles in the nebula, meaning that IC 63 is also a reflection nebula.

This colourful and ghostly [nebula](#) is slowly dissipating under the influence of [ultraviolet radiation](#) from Gamma Cassiopeiae. However, IC 63 is not the only object under the influence of the mighty star. It is part of a much larger nebulous region surrounding Gamma Cassiopeiae that measures approximately two degrees on the sky—roughly four times as wide as the full Moon.

This region is best seen from the Northern Hemisphere during autumn and winter. Though it is high in the sky and visible all year round from Europe, it is very dim, so observing it requires a fairly large telescope and dark skies.

From above Earth's atmosphere, Hubble gives us a view that we cannot hope to see with our eyes. This photo is possibly the most detailed image that has ever been taken of IC 63, and it beautifully showcases Hubble's capabilities.

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