



Star-forming Region AFGL 5180

Hubble Reveals Turbulent Outbursts of Star Formation

What at first might appear as a fireworks finale is actually a fantastic lightshow of the raw interplay of matter and energy. This vivid display occurs in a region of our galaxy ablaze with star formation called AFGL 5180.

NASA's Hubble Space Telescope observations in near-infrared light capture the fiery birth of a massive star that is dramatically churning up the space around it. Because it is embedded within a cold, dark cloud of gas and dust, the stellar behemoth is largely hidden from view at most infrared wavelengths and is completely unseen in visible light.

Most striking in the image are the star's twin jets that appear as a bright diagonal line, stretching from lower left to upper right. These jets of high-speed gas are ejected from the star and plowing into and through the surrounding nebula.

Additionally, intense radiation and torrential winds that burst forth from the star like an exploding fireworks shell shape the nebula. This outflow reveals a lumpy and bumpy landscape, where dense clumps of gas resist this energetic push. Evidence of this is at the bottom of the image, where dark pillars point back toward the central star. These dense clumps of cold gas and dust weather the outflow, and are blown back into a stream-lined shape.

The mayhem of AFGL 5180 takes place within a vast collection of similar regions, known as the Gemini OB1 molecular cloud complex, located about 6,500 light-years from Earth. The nebulae within the complex feature numerous arcs and ring-shaped structures caused by similar outflows from the massive young stars embedded within them. But, unlike a real fireworks show that lasts less than an hour, these stellar fireworks will go on for many thousands of years.

Image Credits: ESA/Hubble & NASA, J. C. Tan (Chalmers University & University of Virginia), R. Fedriani (Chalmers University)

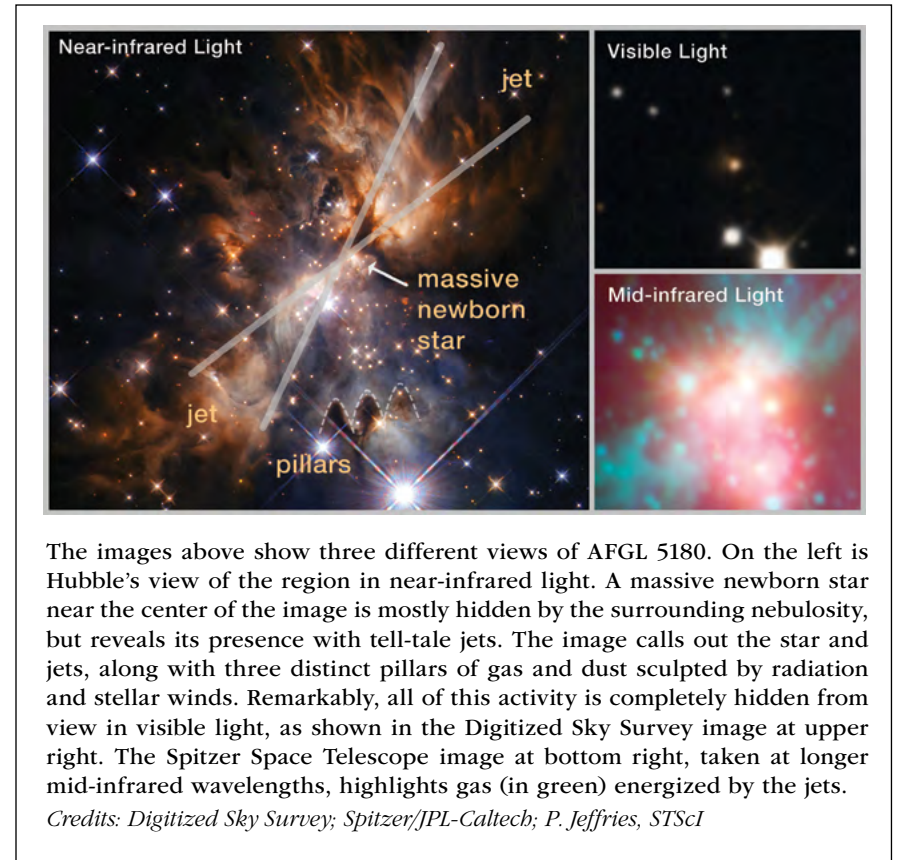
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The images above show three different views of AFGL 5180. On the left is Hubble's view of the region in near-infrared light. A massive newborn star near the center of the image is mostly hidden by the surrounding nebulosity, but reveals its presence with tell-tale jets. The image calls out the star and jets, along with three distinct pillars of gas and dust sculpted by radiation and stellar winds. Remarkably, all of this activity is completely hidden from view in visible light, as shown in the Digitized Sky Survey image at upper right. The Spitzer Space Telescope image at bottom right, taken at longer mid-infrared wavelengths, highlights gas (in green) energized by the jets.

Credits: Digitized Sky Survey; Spitzer/JPL-Caltech; P. Jeffries, STScI

VOCABULARY

Star: A huge ball of gas held together by gravity. The central core of a star is extremely hot and produces energy. Stars come in different sizes, colors, and temperatures.

Near-infrared: The region of the infrared spectrum that is closest to visible light. Near-infrared light has slightly longer wavelengths and slightly lower frequencies and energies than visible light.

For images and information on the Hubble mission, go to www.nasa.gov/hubble and hubblesite.org. Follow the Hubble mission on social media: @NASAHubble.



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