HERBIG-HARO JET HH 24

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About This Image

Just in time for the release of the movie "Star Wars Episode VII: The Force Awakens," NASA's Hubble Space Telescope has photographed what looks like a cosmic, double-bladed lightsaber.

In the center of the image, partially obscured by a dark, Jedi-like cloak of dust, a newborn star shoots twin jets out into space as a sort of birth announcement to the universe.

"Science fiction has been an inspiration to generations of scientists and engineers, and the film series Star Wars is no exception," said John Grunsfeld, astronaut and associate administrator for NASA's Science Mission Directorate. "There is no stronger case for the motivational power of real science than the discoveries that come from the Hubble Space Telescope as it unravels the mysteries of the universe."

This celestial lightsaber does not lie in a galaxy far, far away, but rather inside our home galaxy, the Milky Way. It's inside a turbulent birthing ground for new stars known as the Orion B molecular cloud complex, located 1,350 light-years away.

When stars form within giant clouds of cool molecular hydrogen, some of the surrounding material collapses under gravity to form a rotating, flattened disk encircling the newborn star.

Though planets will later congeal in the disk, at this early stage the protostar is feeding on the disk with a Jabba-like appetite. Gas from the disk rains down onto the protostar and engorges it. Superheated material spills away and is shot outward from the star in opposite directions along an uncluttered escape route – the star's rotation axis.

Shock fronts develop along the jets and heat the surrounding gas to thousands of degrees Fahrenheit. The jets collide with the surrounding gas and dust and clear vast spaces, like a stream of water plowing into a hill of sand. The shock fronts form tangled, knotted clumps of nebulosity and are collectively known as Herbig-Haro (HH) objects. The prominent HH object shown in this image is HH 24.

Just to the right of the cloaked star, a couple of bright points are young stars peeking through and showing off their own faint lightsabers – including one that has bored a tunnel through the cloud towards the upper-right side of the picture.

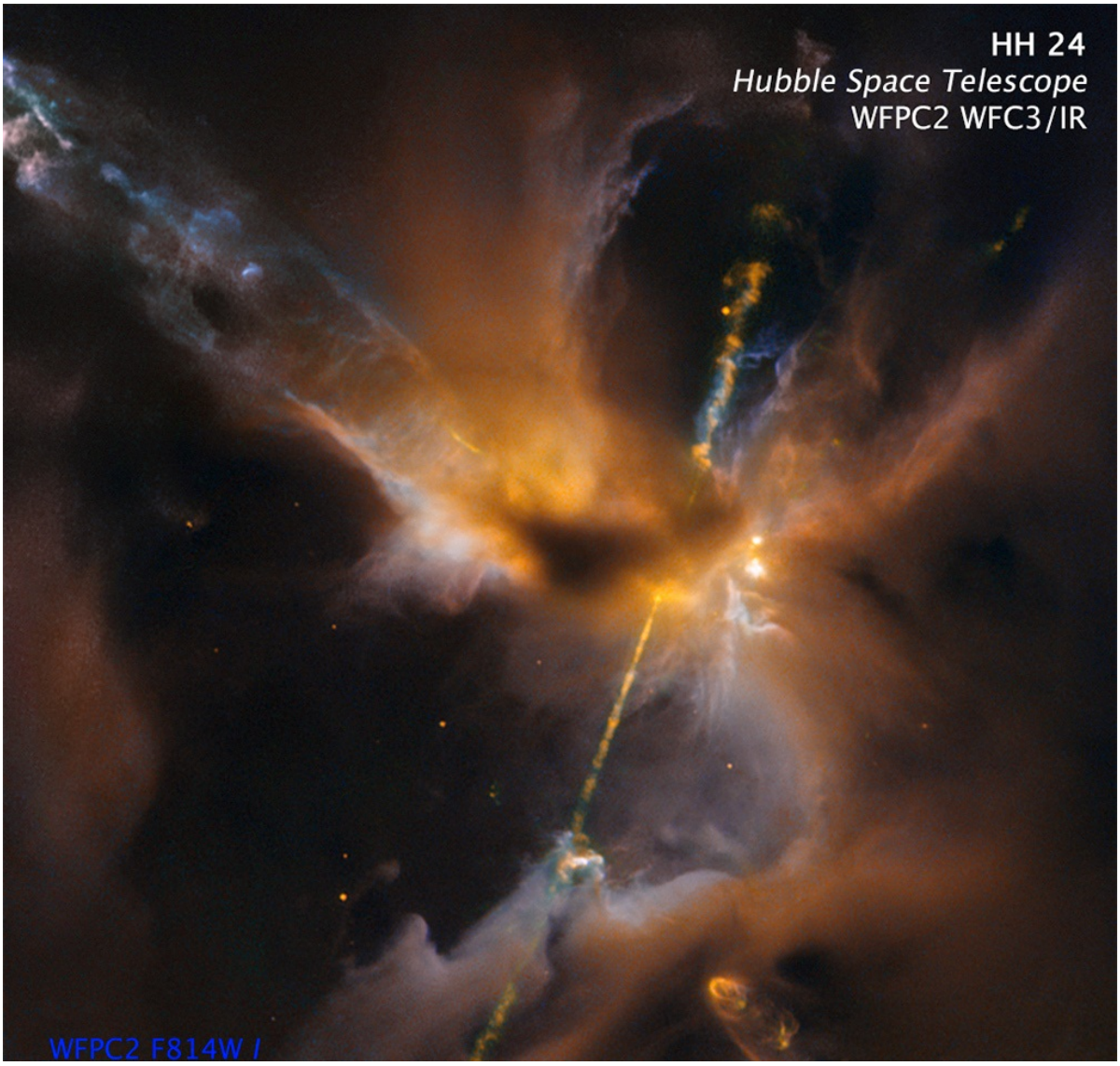
Overall, just a handful of HH jets have been spotted in this region in visible light, and about the same number in the infrared. Hubble's observations for this image were performed in infrared light, which enabled the telescope to peer through the gas and dust cocooning the newly forming stars and capture a clear view of the HH objects.

These young stellar jets are ideal targets for NASA's upcoming James Webb Space Telescope, which will have even greater infrared wavelength vision to see deeper into the dust surrounding newly forming stars.

CREDITS:
NASA and ESA;
Acknowledgment: NASA, ESA, the Hubble Heritage (STScI/AURA)/Hubble-Europe (ESA) Collaboration, D. Padgett (GSFC), T. Megeath (University of Toledo), and B. Reipurth (University of Hawaii)

KEYWORDS:
EMISSION NEBULAS | NEBULAS | REFLECTION NEBULAS | STARS | STELLAR JETS

Fast Facts

About The Object	
Object Name	Herbig-Haro 24, HH 24
Object Description	Herbig-Haro Jet
R.A. Position	05h 46m 8.87s
Dec. Position	00° 10' 11.99"
Constellation	Orion
Distance	1,350 light-years (414 parsecs)
About The Data	
Data Description	The image of HH 24 was created from Hubble archival data from the following proposals: **9160**: D. Padgett (NASA/GSFC) et al.; **11548**: T. Megeath (U. Toledo) et al.; **13485**: B. Reipurth (U. Hawaii) et al.
Instrument	HST>WFPC2, and HST>WFC3/IR
Exposure Dates	August 4, 2001, October 13, 2009, and February 18, 2014
Filters	F814W (I), F814W (I), F164N ([Fe II])
About The Image	
Color Info	This image is a composite of separate exposures acquired by the WFPC2 and WFC3/IR instruments. Several filters were used to sample various wavelengths. The color results from assigning different hues (colors) to each monochromatic (grayscale) image associated with an individual filter. In this case, the assigned colors are: Blue: F814W (I) Green: F814W (I) + F160W (H) Orange: F160W (H) Red: F164N ([Fe II])
Compass Image	

Fast Facts Help

About The Object	
Object Name	A name or catalog number that astronomers use to identify an astronomical object.
Object Description	The type of astronomical object.
R.A. Position	Right ascension – analogous to longitude – is one component of an object's position.
Dec. Position	Declination – analogous to latitude – is one component of an object's position.
Constellation	One of 88 recognized regions of the celestial sphere in which the object appears.
Distance	The physical distance from Earth to the astronomical object. Distances within our solar system are usually measured in Astronomical Units (AU). Distances between stars are usually measured in light-years. Interstellar distances can also be measured in parsecs.
Dimensions	The physical size of the object or the apparent angle it subtends on the sky.
About The Data	
Data Description	**Proposal:** A description of the observations, their scientific justification, and the links to the data available in the science archive. **Science Team:** The astronomers who planned the observations and analyzed the data. "PI" refers to the Principal Investigator.
Instrument	The science instrument used to produce the data.
Exposure Dates	The date(s) that the telescope made its observations and the total exposure time.
Filters	The camera filters that were used in the science observations.
About The Image	
Image Credit	The primary individuals and institutions responsible for the content.
Publication Date	The date and time the release content became public.
Color Info	A brief description of the methods used to convert telescope data into the color image being presented.
Orientation	The rotation of the image on the sky with respect to the north pole of the celestial sphere.