



<p>Hubblecast Episode 32: Born in Beauty: Proplyds in the Orion Nebula</p> <p>EMBARGOED UNTIL 16:00 (CET)/10:00 am EST 14 Dec, 2009</p>	
<p>00:00 [Visual starts]</p> <p>00:01 [Narrator]</p> <p>Visible to the naked eye, only 1500 light-years from Earth, the great Orion Nebula has been known and revered since ancient times. A popular target of Hubble, researchers have now identified 42 new discs within it that could be the beginnings of new planetary systems like our own.</p> <p>00:38 [Woman] This is the Hubblecast! News and images from the NASA/ESA Hubble Space Telescope.</p> <p>00:51 [Dr. J] In the sword, just under the belt in the constellation of Orion the Hunter, is the majestic Orion Nebula. The Orion Nebula is one of the best known examples of a star-forming nebula – a swirling cloud of gas and dust where stars begin their journey of life. In the early 1990s astronomers discovered so-called proplyds in Orion using Hubble. A proplyd is a protoplanetary disc and it forms along with a newborn star in a spinning mixture of gas and dust; at the centre, you have the star forming and around it bits of dust clump together to form a disc. Essentially, proplyds are thought to be young planetary systems in the making.</p> <p>1:32 [Narrator] Like many ancient civilisations, the Mayan culture in parts of what is now southern Mexico and northern Central America was tied to the heavens. In fact, the constellation of Orion and the Orion Nebula play an important role in their story of creation, with three of the brightest stars in the constellation representing a hearth and the nebula the fire that warms it.</p>	<p>Standard Hubblecast Sequence</p>  

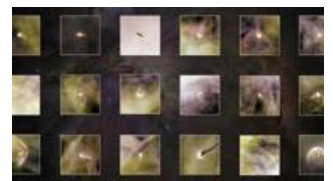
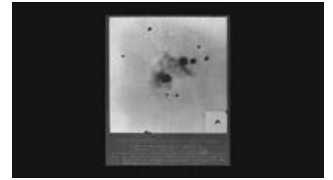
One of the first targets of astronomers after telescopes were invented in the 17th century, the Orion Nebula was also the first nebula ever photographed, over a hundred years ago, by the American astronomer Henry Draper, a pioneer in astrophotography. His photograph, taken in 1880, represents a milestone in the history of astronomy.

[Dr. J]
2:19

The beauty of the Orion Nebula is not its only draw; astronomers are interested in it because it is one of the nearest star-forming regions to Earth with stars that are massive enough to heat up the surrounding gas, making it glow. This fascinating object has been a favourite target of Hubble's from very early on in the observatory's lifetime. The sharpest image ever taken of the Orion Nebula was released in 2006. This image from Hubble's Advanced Camera for Surveys shows more than 3000 stars of various sizes — some of which had never before been seen in visible light. Looking at the frenzied mixture of gas and swirling dust, it's pretty clear that a lot is going on inside the Orion Nebula.

3:00
[Narrator]

Within the awe-inspiring, gaseous folds of Orion, researchers — using data from the wide-field channel on Hubble's Advanced Camera for Surveys — have identified two different types of discs: the ones that lie close to the brightest star in the cluster (Theta 1 Orionis C) and those farther away from it. The star affects the nearby discs by heating up the gas within them, causing them to shine brightly. The 'excited' material produces many glowing cusps, which all face the bright star and are thus randomly oriented within the nebula. Other interesting features enhance the looks of these captivating objects, such as jets of matter flowing away and shock waves. The dramatic shock waves are formed when the stellar wind from the nearby massive star meets the gas in the nebula, producing interesting shapes. They sometimes appear like boomerangs or arrows and, in the case of 181-825, the shock wave makes the protoplanet look like a space jellyfish!



4:06

[Dr. J]

The discs that are farther away do not receive enough energetic radiation from the star to set the gas ablaze: that's why these discs can only be detected as a dark silhouette against the bright background of the nebula. The dust in the disc simply absorbs the light from the background. It is in these "silhouette" discs, that astronomers are better able to study the properties of the dust grains that are thought to clump together and possibly form planets like our own.

4:32

[Narrator]

The bright star that illuminates some of the proplyds, allowing us to see them, is both a blessing and a curse. The powerful radiation that lights them up also threatens their very existence, as the disc material, once heated up, is very likely to dissipate and dissolve, destroying their potential to become planets. Some of the bright proplyds are doomed to be torn apart, but others will survive and, perhaps evolve into planetary systems.

5:01

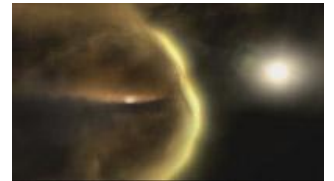
[Dr. J]

It is relatively rare to see images of proplyds in visible light, however, the resolution and sensitivity of Hubble combined with the Orion Nebula's proximity to Earth allow for an excellent view of these fascinating objects. Although proplyds may appear to be only humble smudges, some of them are, in fact, the seeds of solar systems to come.

This is Dr. J signing off for the Hubblecast. Once again, nature has surprised us beyond our wildest imagination.

5:29

END



Hubblecast is produced by ESA/Hubble at the European Southern Observatory in Germany.

The Hubble mission is a project of international cooperation between NASA and the European Space Agency.

Credits