

Astrophysics

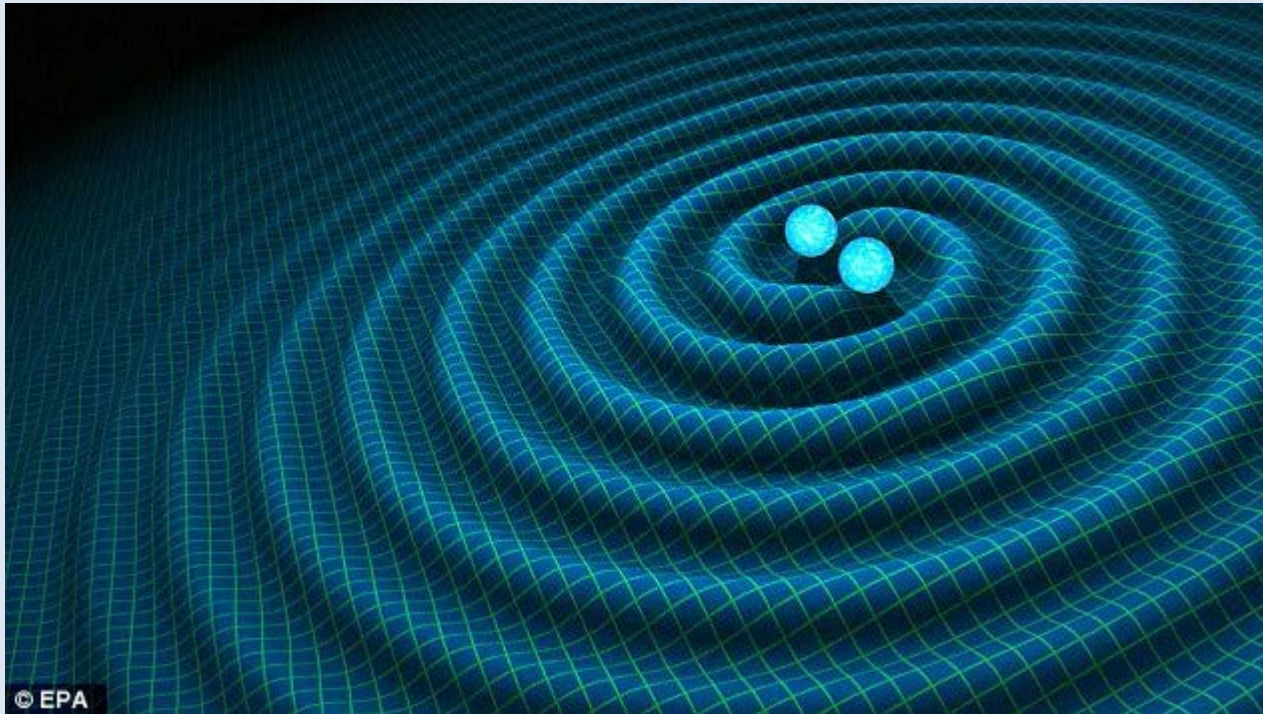


Monkey Head Nebula

Astrophysics is a branch of space science that applies the laws of physics and chemistry to explain the birth, life and death of stars, planets, galaxies, nebulae and other objects in the universe.

Astrophysics

Gravitational waves are disturbances in the curvature of spacetime, generated by accelerated masses, that propagate as waves outward from their source at the speed of light. They were predicted in 1916 by Albert Einstein on the basis of his general theory of relativity.



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Vast interstellar events where clouds of charged matter hurtle into each other and spew out high-energy particles have now been reproduced in the lab with high fidelity.



An example of an interstellar collisionless shock is seen in this photo of a bow shock in the Orion Nebula. Image credit: NASA and the Hubble Heritage Team (STScI/AURA)

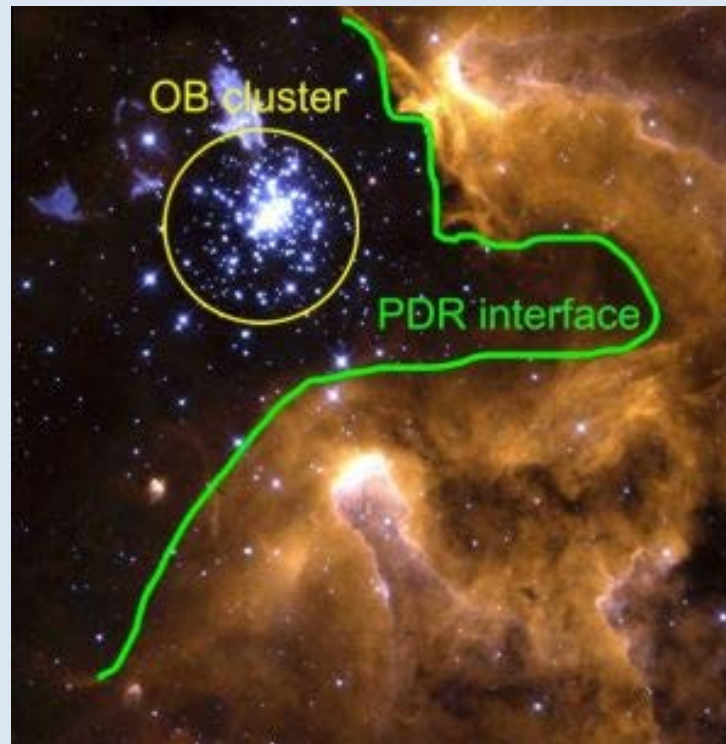
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One of the Astrophysics' goals is to search for life on planets around other stars. Proxima Centauri is our Sun's nearest neighbor at just over four light years away, and it appears that its solar system may contain an Earth-like world.



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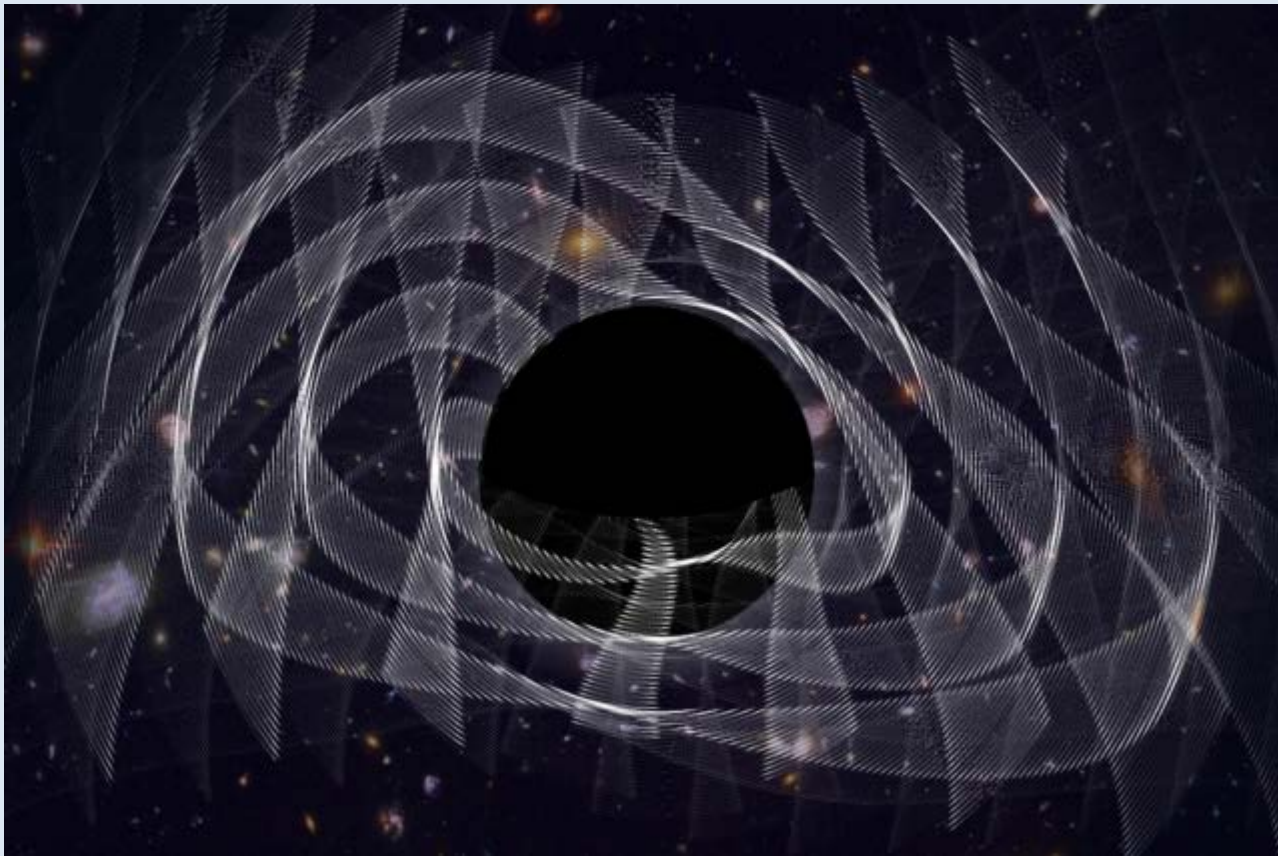
Photon-Dominated Regions or Photo-Dissociation Regions (PDRs) are interstellar regions where stellar Far Ultraviolet Radiation dominates the physical and chemical properties of the local interstellar medium.



HST picture of NGC 3603 illustrates the typical PDR situation.

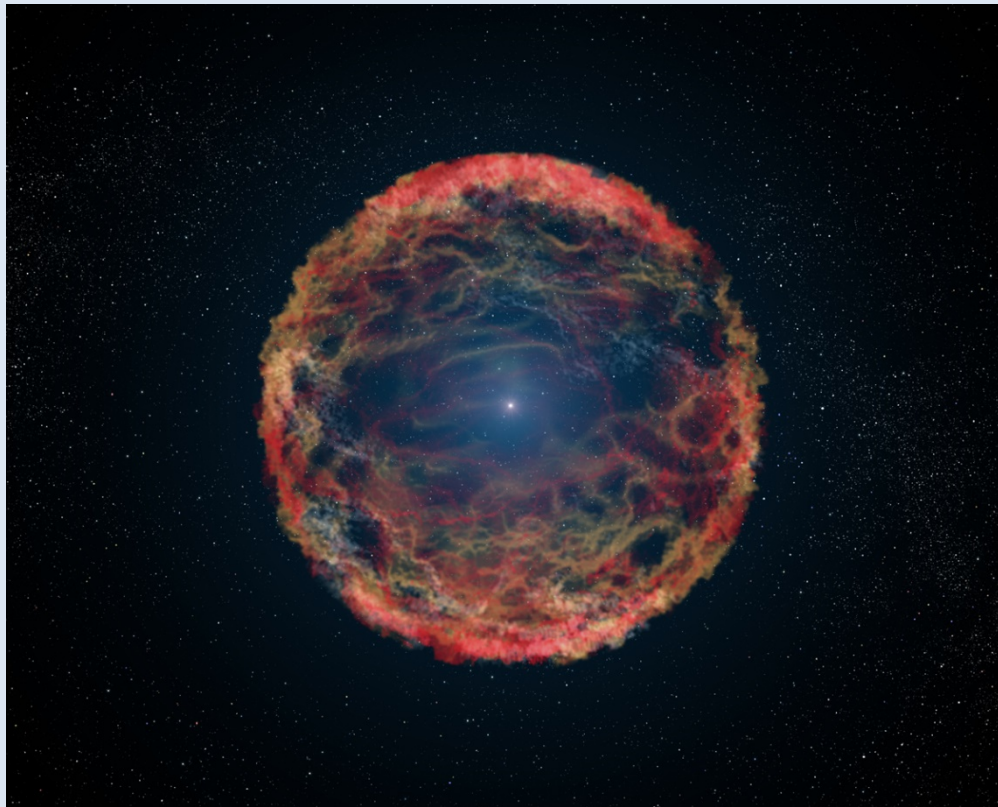
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MIT scientists have captured the “ringing” of a newly-formed black hole, in the form of gravitational waves, depicted in this artist’s illustration.



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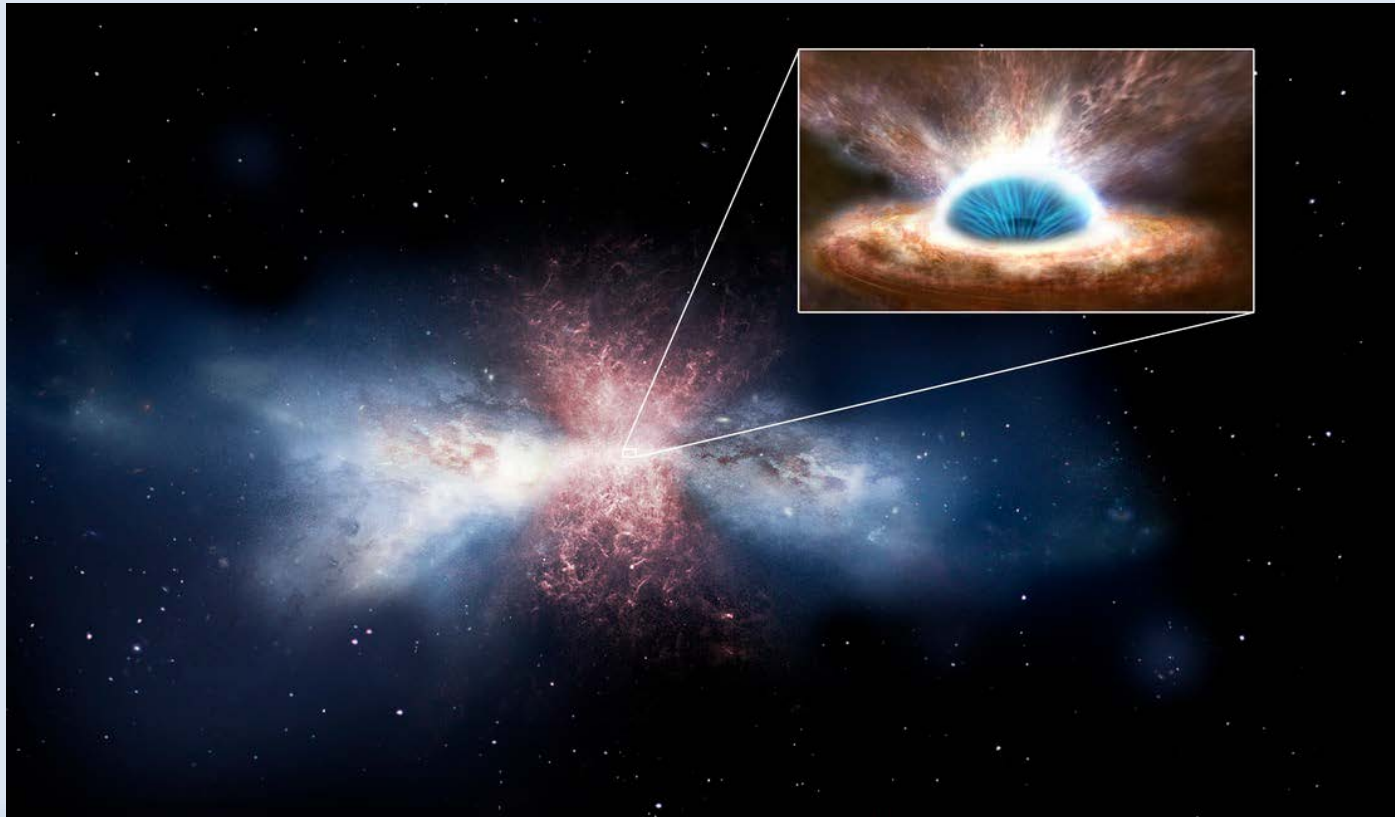
A newfound star in a nearby galaxy appears to have cheated death by blowing up at least twice as a supernova. It could be a throwback to the first stars that ever formed.



An artist's impression of a supernova involving a massive star.
(Credit: NASA, ESA, G. Bacon (STScI))

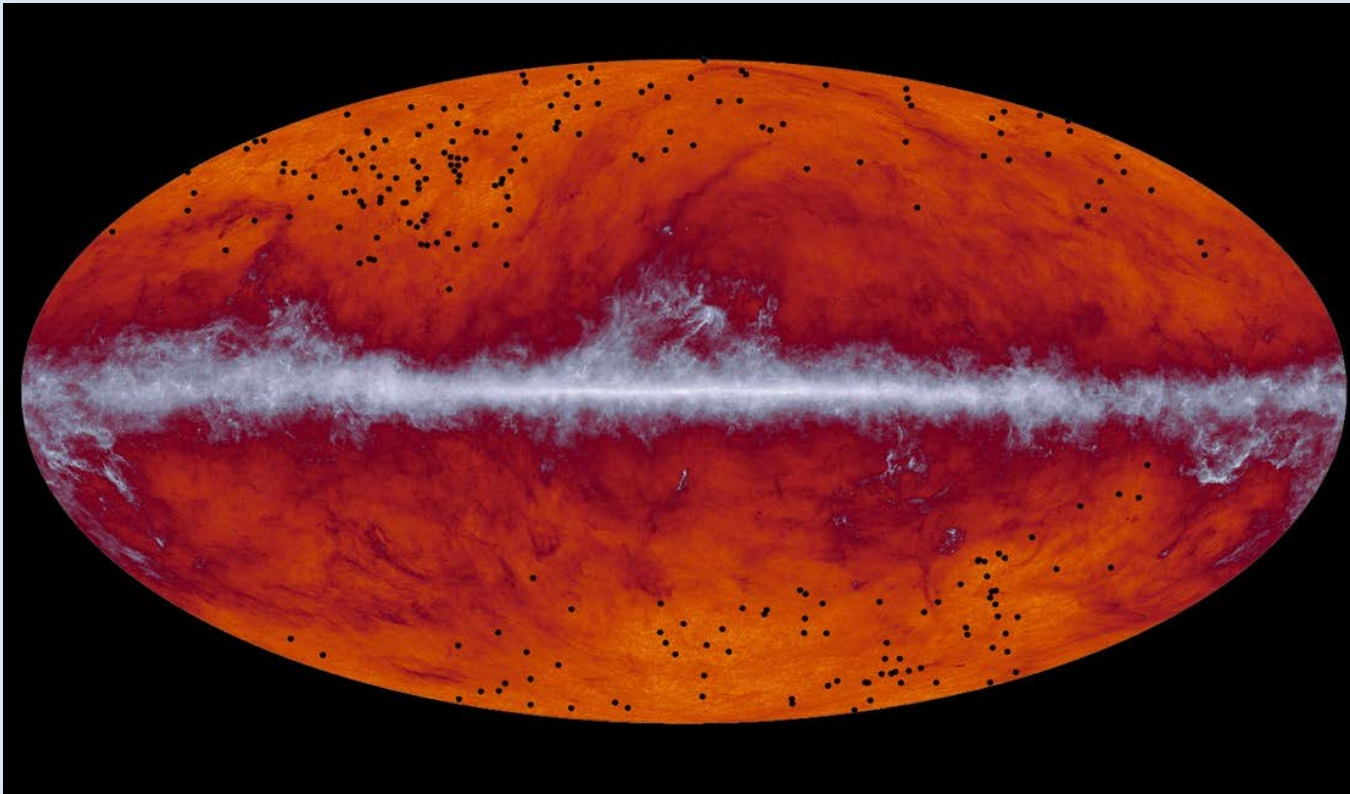
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Scientists studying the supermassive black hole at the center of the galaxy IRAS F11119+3257 have found proof that the winds blowing from the black hole are sweeping away the host galaxy's reservoir of raw star-building material.



Astrophysics

This map of the entire sky was captured by the European Space Agency's Planck mission. The band running through the middle corresponds to dust in our Milky Way galaxy. The black dots indicate the location of galaxy cluster candidates.



References:

- <https://www.space.com/26218-astrophysics.html>
- <https://science.nasa.gov/astrophysics>
- <https://www.kavlifoundation.org/tags/astrophysics>
- <https://www.nationalgeographic.com/news/2017/10/what-are-gravitational-waves-ligo-astronomy-science/>
- <https://zeus.ph1.uni-koeln.de/node/346>
- <https://www.dailymail.co.uk/sciencetech/article-4073978/From-gravitational-waves-discovery-Earth-2-0-5-astrophysics-achievements-2016-revealed.html>
- <https://www.sciencedirect.com/topics/physics-and-astronomy/astrophysics>
- <http://news.mit.edu/topic/astrophysics>
- <http://news.mit.edu/2019/ringing-new-black-hole-first-0912>
- <http://news.mit.edu/2019/collisionless-shock-reproduced-astrophysics-0807>
- <https://www.herschel.caltech.edu/image/nhsc2015-001a>
- <https://www.herschel.caltech.edu/image/nhsc2015-002a>

This presentation was created by students taking part in the programme
"Four Seasons in the Sky"

