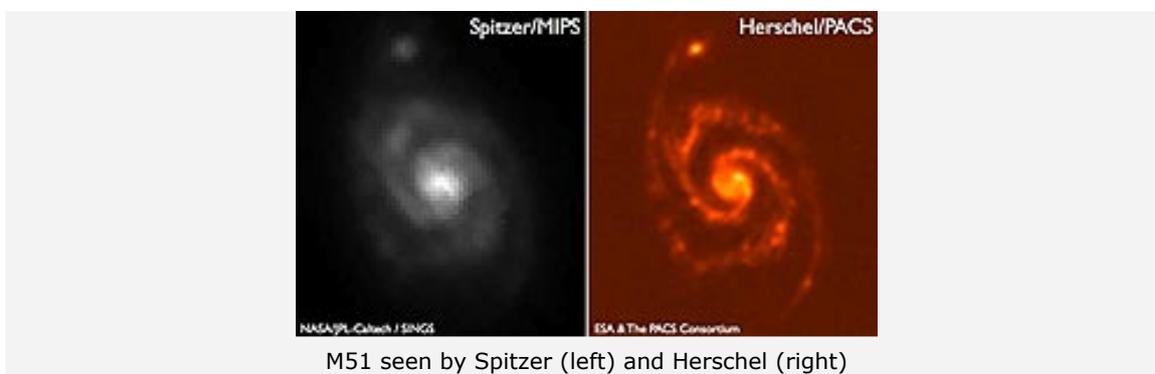
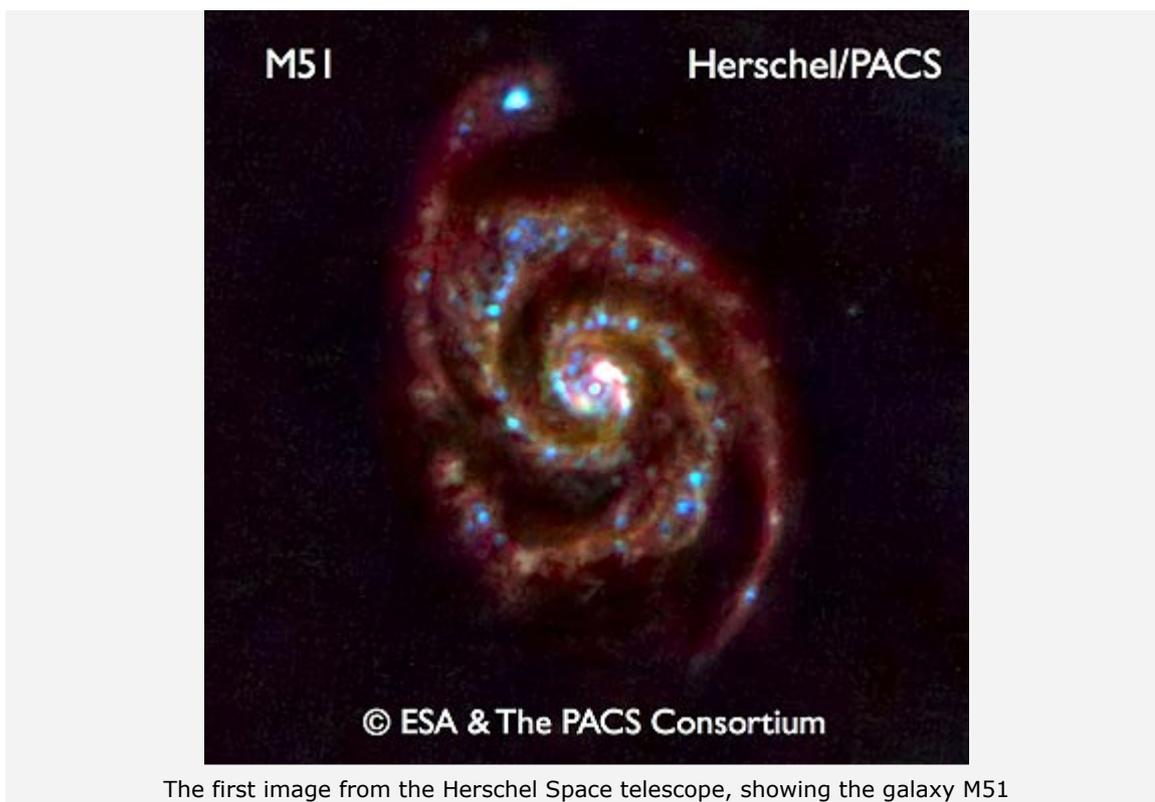


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## Herschels first picture of an object in space

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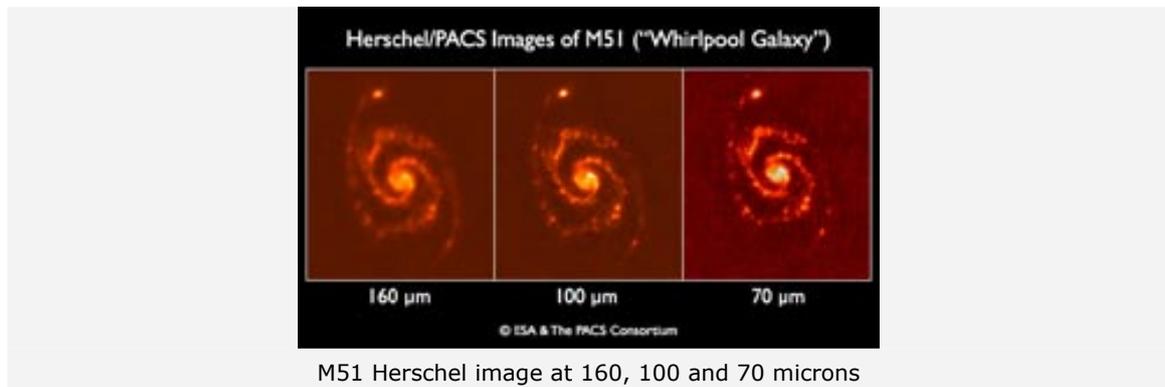


The European space telescope Herschel captured its first image of an object in the Universe. Scientists are talking about the comparatively high quality of the picture taken by Herschel's PACS instrument. The image shows the galaxy M51, known as the 'Whirlpool Galaxy'. Although at this early stage all the settings of the telescope are not fully calibrated, its performance already exceeds expectations.

The famous 'Whirlpool Galaxy' was first observed by Charles Messier in 1773 and he designated it Messier 51 (M51). This spiral galaxy lies relatively nearby, about 35 million light-years away, in the constellation of Canes Venatici. M51 was the first galaxy discovered with a spiral structure.

The image is a composite of three observations taken at 70, 100 and 160 microns, and was taken by PACS on 14 and 15 June, immediately after the spacecraft's cryocover was opened.

Herschel was carried into space on 14 May 2009, together with the Planck satellite – which will examine the cosmic microwave background radiation – by an Ariane 5 ECA launch vehicle. The German contribution to Herschel was financed by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) using funds from the Germany Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie; BMWi).



German scientists and engineers are significantly involved in this European Space Agency (ESA) mission. The instrument that produced the first image, the Photodetector Array Camera and Spectrometer (PACS) was developed under the direction of the Max Planck Institute for Extraterrestrial Physics (Max-Planck-Institut für extraterrestrische Physik; MPE).

During the last few weeks, while Herschel was making its 1.5-million kilometre journey to its target orbit around the second Lagrange point (L2) of the Sun-Earth system, all the spacecraft systems were being tested. Everything worked perfectly, in accordance with a detailed plan.

The first truly critical milestone was passed at 12:53 CEST (10:53 UTC) on 14 June, when the pyrotechnic bolts holding down the vacuum-tight cover on Herschel's cryostat fired and the cover opened. Known as the cryocover, this 'lens cap' had closed the container of liquid helium that houses the coldest parts of the spacecraft's instruments, protecting them during ground handling, launch and the early part of the journey to L2. Once the cryocover was open, the instruments could 'see' into space for the first time.

Herschel is the first space observatory that covers the complete spectrum of wavelengths from the far infrared to the sub-millimetre band (60 – 670 micrometres). Herschel will examine parts of this spectrum for the first time. This is the reason why astronomers expect an abundance of new discoveries. Scientists will examine the development and evolution of galaxies since close to the beginning of the universe. Herschel will also contribute to our understanding of comets and investigate planetary atmospheres and surfaces in our Solar System.

### Herschel Space Telescope

To undertake these tasks, Herschel carries three scientific instruments:

- an imaging photometer and integral field line spectrometer – PACS (Photodetector Array Camera and Spectrometer)
- a high-resolution heterodyne spectrometer – HIFI (Heterodyne instrument for the Far Infrared) and the imaging photometer and
- an imaging Fourier transform spectrometer – SPIRE (Spectral and Photometric Imaging Receiver)

The main mirror of the telescope has a diameter of 3.5 metres. Herschel is therefore the largest space telescope ever, with a mirror diameter about one-and-a-half times larger than Hubble. To save weight, which is relevant for the launch, the mirror is made out of the ceramic material silicon carbide – used for the first time in a mirror of this size.

Herschel will remain in operation for about three years. The duration of the mission is determined primarily by the availability of liquid helium for instrument cooling and the fuel needed for the thrusters

that control the spacecraft's attitude and orbit. Because the Ariane 5 ECA launch vehicle delivered Herschel and Planck very accurately into their transfer orbits, Herschel used less fuel for trajectory corrections than expected.

With the capture of this first image, Herschel has begun its work. As the mission progresses, the scientists expect to gain an enormous amount of new and important knowledge about cosmology, the Big Bang and the origin and the structure of the universe.

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