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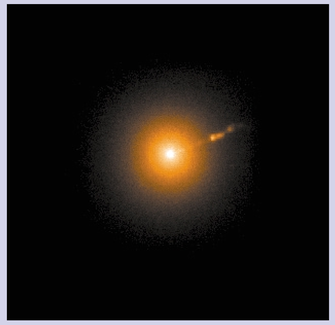
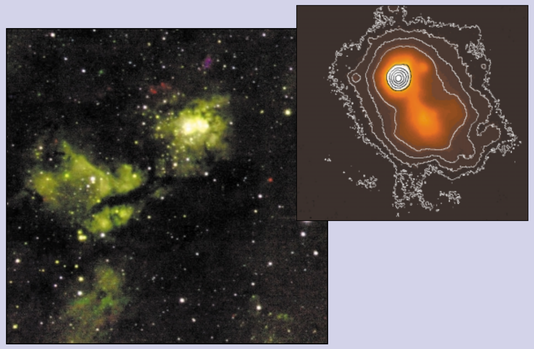


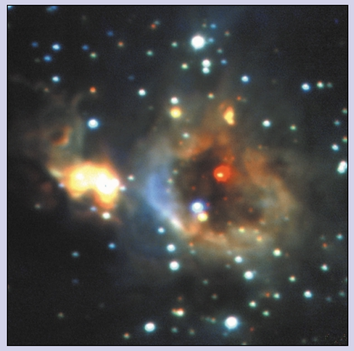
M87 - Giant Elliptical Galaxy

Massive black holes are believed to be common in the centres of galaxies (including our own Milky Way). This infrared image (taken with the UKIRT fast-track imager, UFTI) shows a jet of matter emanating from a supermassive Black Hole - 3 billion times more massive than our sun - in the centre of a supermassive galaxy, the Messier object M87. Accretion onto the Black Hole powers the jet, which shines through synchrotron radiation.



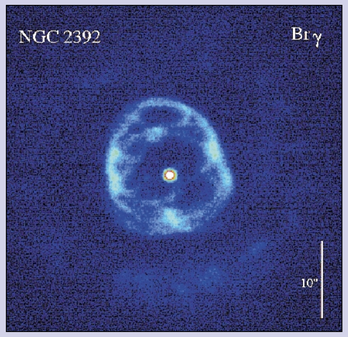
The Star-Forming Region W51

Star formation is accompanied by some of the most remarkable sights in the visible sky, and the same is true when one observes in the infrared. Infrared observations see through the dust which veils most of the details of the star formation process from scrutiny at visible wavelengths. This image shows a busy star-forming region in our galaxy. The most massive stars formed in this region are as much as one thousand times as bright as the Sun. This "colour" frame combines images through a combination of filters which pick out infrared light from molecular hydrogen and atomic iron. The smaller image shows a "zoomed" part of the cloud in the thermal infrared, which is sensitive to heated dust localized around the forming stars.



Star formation in Monoceros

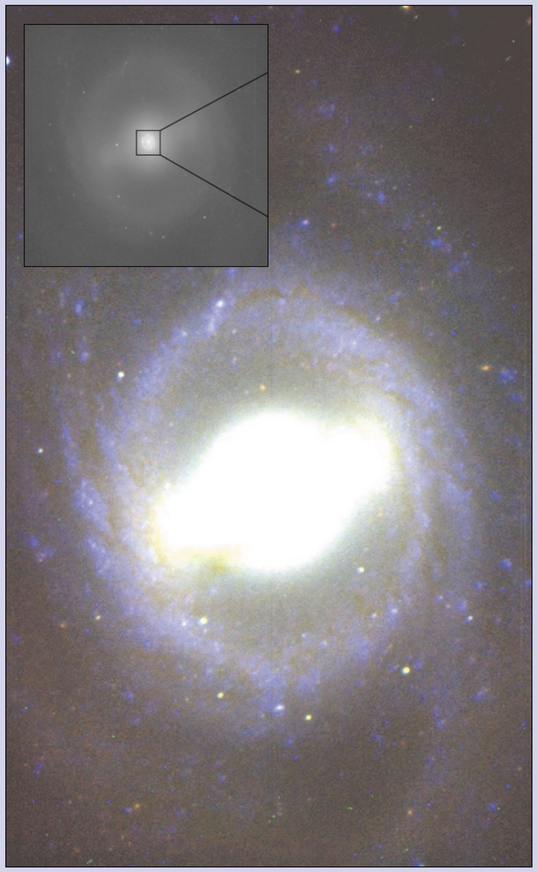
Spectacular colours in the infrared characterize this site of massive star formation in Monoceros. Young stars embedded in dusty gas cores appear red or orange; foreground, normal stars appear blue. An extensive, nebulous ring surrounding this region is also seen in light scattered from interstellar dust grains. Observing conditions were not good while this UFTI image was obtained, but the result is one of the most striking UFTI images yet produced.



Planetary Nebula - the Eskimo

The planetary nebula NGC 2392, also known as the Eskimo nebula, shows intricate rings surrounding the hot bubble of ionized gas. These arise as the central, dying star "balloons off" its outer layers. A fainter, more diffuse, larger ring surrounds the whole system; this outer ring is presumably the result of a much earlier outburst. The infrared light in this image arises from recombining Hydrogen atoms.

UKIRT, the UK Infrared Telescope, remains the world's largest dedicated Infrared telescope. Currently UKIRT operates out to wavelengths of 5 microns - some ten times that of visible light. Imaging and spectroscopy out to 20 microns will be possible when UKIRT takes delivery of a new thermal-infrared instrument in 2001. A programme of upgrades carried out over the last 7 years rendered UKIRT's raw image quality (unassisted by adaptive optics) second to none on the summit of Mauna Kea. UKIRT regularly delivers infrared images with seeing of 0.5 arcseconds, over fields of view up to 1.5 arcminutes in a single frame. Here we show some of the images which this remarkable unassisted resolution permits.



Rings and Bars in Messier 95

INGRID was also used to image the spiral galaxy Messier 95 (NGC 3351), a galaxy at a distance of some 30 million light years from Earth. The image shows a combination of near-infrared INGRID images in the J and K_s bands tracing the location of old stars, and an optical image, obtained with the 1m Jacobus Kapteyn Telescope, which primarily traces young stars.

The first image shows the morphology of the barred spiral galaxy Messier 95. Young stars and sites of current star formation show up as blue regions, with the inner ring featuring prominently. The red light, measured with INGRID, traces dust-lanes in the galaxy, and the older stellar populations. The dust lanes, lacking blue emission, are seen as brownish red in the image; the bar is made up of old stars and shows up as white. The composition in the second image is a J-band image and the inset shows the bright nuclear ring of enhanced star formation in J, at a resolution of some 0.7 arcsec or just over 100 light-years. Rings and bars are directly related to the overall dynamics of their host galaxies, and as such serve as powerful probes of the physical mechanisms that organise star formation.

Gravitational Arcs in Abell 2218

This image shows the full capability of the WHT, showing a combination of a blue (B-band) frame acquired using an optical camera on the WHT Cassegrain focus with two near-infrared exposures in the J- and K-bands obtained with INGRID with the B (0.4=B5m), J (1.2=B5m), and K (2.2=B5m) images coded as blue, green and red. The image reveals the central regions of the massive cluster of galaxies Abell 2218, at a distance of approximately 2 thousand million light years from Earth.

The field of view of this image is 3 arcminutes, corresponding to 2 million light years across at the distance of the cluster. Several arc-like features are clearly visible around the brightest galaxies at the cluster center. These are the distorted and gravitationally magnified images of very distant galaxies behind the cluster. The huge concentration of dark matter in the core of the cluster acts as a gravitational lens, bending the paths of light rays from the background galaxies and in the process magnifying their images, as predicted by Einstein's theory of relativity.

Wide-field Infrared Imaging: INGRID at the WHT

The 4.2-m William Herschel Telescope (WHT) at the Roque de los Muchachos Observatory on the Island of La Palma (Spain) is the largest in Western Europe. It is a general purpose telescope equipped with instruments for a wide range of astronomical observations. A recent development highlight is the successful commissioning of INGRID (Isaac Newton Group Red Imaging Device) on the WHT, a state-of-the-art wide-field near-infrared camera. This camera provides astronomers with the opportunity to make large field of view, high-resolution, deep, near-infrared observations of the universe, as is demonstrated by the images achieved on the first nights of scientific use. With its enhanced capabilities the WHT allows astronomers to image the cosmos at wavelengths from ultraviolet to infrared by using INGRID and the optical instruments already on the WHT.