

## AUFGABE 4C

Stellen Sie aus dem Internet eine Serie von IR- Beobachtungen (**Spitzer**) oder UV- Beobachtungen (**GALEX**) von 5 Spiralgalaxien zusammen mit einer Beschreibung der Charakteristika der gezeigten Objekte.

### NGC 1566



This view shows the beautiful spiral galaxy NGC 1566, located approximately 60 million light-years away in the constellation Dorado.

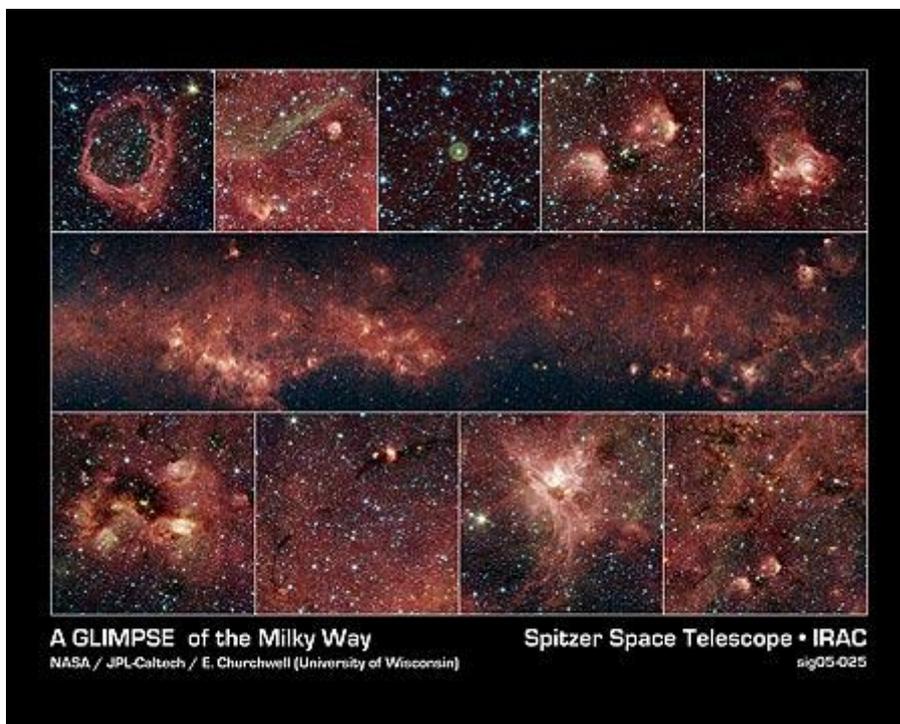
The faint blue light is coming from mature stars, while the glowing red spiral arms indicate active star formation and dust emission.

About the Object (1)	
<b>Object name:</b>	NGC 1566
<b>Object type:</b>	Spiral galaxy
<b>Position (J2000):</b>	<b>RA:</b> 04h 20m 0.40s <b>Dec:</b> -54° 56' 16.00"
<b>Distance:</b>	60 million light-years
<b>Constellation:</b>	Dorado
About the Data	
Spitzer Data	

<b>Image Credit:</b>	NASA/JPL-Caltech/R. Kennicutt (University of Arizona) and the SINGS Team
<b>Instrument:</b>	IRAC
<b>Wavelength:</b>	3.6 (blue), 4.5 (green), 5.8-8.0 (red) microns
<b>Image scale:</b>	12.2x12.2 arcmin
<b>Orientation:</b>	North is 123 deg CW from up
<b>Release Date:</b>	2005/09/15

<http://www.jpl.nasa.gov/multimedia/slideshows/spitzer-200605/slide3.cfm>

### A GLIMPSE of the Milky Way



In visible light, the bulk of our Milky Way galaxy's stars are eclipsed behind thick clouds of galactic dust and gas. But to the infrared eyes of NASA's Spitzer Space Telescope, distant stars and dust clouds shine with unparalleled clarity and color.

In this panoramic image (center row) from the Galactic Legacy Infrared Mid-Plane Survey Extraordinaire (GLIMPSE) project, a plethora of stellar activity in the Milky Way's galactic plane, reaching to the far side of our galaxy, is exposed. This image spans 9 degrees of sky (approximately the width of a fist held out at arm's length).

The red clouds indicate the presence of large organic molecules (mixed with the dust), which have been illuminated by nearby star formation. The patches of black are dense obscuring

dust clouds impenetrable by even Spitzer's super-sensitive infrared eyes. Bright arcs of white throughout the image are massive stellar incubators.

With over 160 megapixels, the full detail in this panorama cannot be appreciated without zooming in to various areas of interest (top and bottom rows). Bubbles, or holes, in the red clouds are formed by the powerful outflows from massive groups of forming stars. Wisps of green indicate the presence of hot hydrogen gas. Star clusters can also be seen as the groupings of blue, yellow, and green specks inside some of the red nebulae, or star-forming clouds. In contrast to the plentiful examples of stellar youth in this montage, Spitzer also sees an object called a planetary nebula (top row, middle). Such nebulae are the final gasp of dying stars like our sun, whose outer layers are blown into space, leaving a burnt-out core of a star, called a white dwarf, behind.

Although this panoramic image captures a large range of the galaxy, it represents only 7.5 percent of the primary GLIMPSE survey, which will image most of the star formation regions in our galaxy.

The infrared images were captured with the Spitzer's Infrared Array Camera (IRAC). The pictures are 4-channel false-color composites, showing emission from wavelengths of 3.6 microns (blue), 4.5 microns (green), 5.8 microns (orange), and 8.0 microns (red).

About the Object (1)	
<b>Object name:</b>	Milky Way, Galactic Plane
<b>Object type:</b>	Spiral galaxy
<b>Position (J2000):</b>	<b>Galactic latitude:</b> -1 to +1 deg <b>Galactic longitude:</b> 327-335 deg
About the Data	
Spitzer Data	
<b>Image Credit:</b>	NASA/JPL-Caltech/E. Churchwell (Univ. Wisconsin)
<b>Instrument:</b>	IRAC
<b>Wavelength:</b>	3.6 (blue), 4.5 (green), 5.8 (orange), 8.0 (red) microns
<b>Image scale:</b>	9x2 degrees
<b>Orientation:</b>	galactic north is up
<b>Release Date:</b>	2005/12/12

<http://www.jpl.nasa.gov/multimedia/slideshows/spitzer-200605/slide4.cfm>

## Splendid Splinter



The spiral galaxy NGC 5907, sometimes known as the "Splinter Galaxy" because of its unusual appearance, is located in the constellation Draco. It is fairly bright, and appears elongated because it has an edge-on alignment when viewed from Earth. It also has a strong set of dust lanes, visible in this image from NASA's Spitzer Space Telescope as red features. The central lane is so pronounced at visible light wavelengths, where it blocks our view of the starlight, that the galaxy was once mistaken for two objects and given two entries in the original New General Catalogue. The catalogue, published by J.L.E. Dreyer in 1888, was an attempt to collect a complete list of all nebulae and star clusters known at the time.

NGC 5907's special orientation and close proximity to Earth have made it a popular target for observation by both professional and amateur astronomers. Over the last decade, ever-improving infrared instrumentation have allowed scientists to detect light from the galaxy that was until now hidden by dust. Recent observations using Spitzer's InfraRed Array Camera at infrared wavelengths from 3-10 microns resulted in the discovery of a significant and potentially massive thick stellar disk. This is the first time that a thick disk has been detected and characterized in the infrared.

This image is composed of images obtained at four wavelengths: 3.6 microns (blue), 4.5 microns (green), 5.8 microns (orange) and 8 microns (red). The contribution from starlight has been subtracted from the 5.8 and 8 micron images to enhance the visibility of the dust features.

About the Object	
<b>Object name:</b>	NGC 5907, Splinter Galaxy
<b>Object type:</b>	Edge-on galaxy
<b>Position (J2000):</b>	<b>RA:</b> 15h 15m 53.70s <b>Dec:</b> 56° 19' 44.00"
<b>Distance:</b>	14 million pc; 46 million light-years

<b>Constellation:</b>	Draco
<b>About the Data</b>	
<b>Spitzer Data</b>	
<b>Image Credit:</b>	NASA/JPL-Caltech/M.L.N. Ashby (Harvard-Smithsonian CfA)
<b>Instrument:</b>	IRAC
<b>Wavelength:</b>	3.6 (blue), 4.5 (green), 5.8 (orange), and 8.0 (red) microns
<b>Exposure Date:</b>	19 December 2003
<b>Exposure Time:</b>	1000 sec per sky position
<b>Image scale:</b>	13.1x9.4 arcmin
<b>Orientation:</b>	North is 60 deg CW from up
<b>Release Date:</b>	2005/04/13

<http://www.jpl.nasa.gov/multimedia/slideshows/spitzer-200605/slide5.cfm>

### Great Observatories Present Rainbow of a Galaxy



NASA's Spitzer, Hubble, and Chandra space observatories teamed up to create this multi-wavelength, false-colored view of the M82 galaxy. The lively portrait celebrates Hubble's "sweet sixteen" birthday.

X-ray data recorded by Chandra appears in blue; infrared light recorded by Spitzer appears in red; Hubble's observations of hydrogen emission appear in orange, and the bluest visible light appears in yellow-green.

About the Object (1)	
<b>Object name:</b>	M 82, Messier 82, NGC 3034, Cigar Galaxy
<b>Object type:</b>	Galaxy
<b>Position (J2000):</b>	<b>RA:</b> 09h 55m 52.20s <b>Dec:</b> 69° 40' 7.00"
<b>Distance:</b>	11.7 million light-years
<b>Constellation:</b>	Ursa Major
About the Data	
Spitzer Data	
<b>Instrument:</b>	IRAC
<b>Release Date:</b>	2006/04/24

<http://www.jpl.nasa.gov/multimedia/slideshows/spitzer-200605/slide6.cfm>

### NASA's Spitzer Images Out-of-This-World Galaxy

*ScienceDaily* (Aug. 5, 2009) — NASA's Spitzer Space Telescope has imaged a wild creature of the dark -- a coiled galaxy with an eye-like object at its center.



The galaxy, called NGC 1097, is located 50 million light-years away. It is spiral-shaped like our Milky Way, with long, spindly arms of stars. The "eye" at the center of the galaxy is actually a monstrous black hole surrounded by a ring of stars. In this color-coded infrared view from Spitzer, the area around the invisible black hole is blue and the ring of stars, white. The black hole is huge, about 100 million times the mass of our sun, and is feeding off gas and dust along with the occasional unlucky star. Our Milky Way's central black hole is tame by comparison, with a mass of a few million suns.

"The fate of this black hole and others like it is an active area of research," said George Helou, deputy director of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. "Some theories hold that the black hole might quiet down and eventually enter a more dormant state like our Milky Way black hole."

The ring around the black hole is bursting with new star formation. An inflow of material toward the central bar of the galaxy is causing the ring to light up with new stars.

"The ring itself is a fascinating object worthy of study because it is forming stars at a very high rate," said Kartik Sheth, an astronomer at NASA's Spitzer Science Center. Sheth and Helou are part of a team that made the observations.

In the Spitzer image, infrared light with shorter wavelengths is blue, while longer-wavelength light is red. The galaxy's red spiral arms and the swirling spokes seen between the arms show dust heated by newborn stars. Older populations of stars scattered through the galaxy are blue. The fuzzy blue dot to the left, which appears to fit snugly between the arms, is a companion galaxy.

"The companion galaxy that looks as if it's playing peek-a-boo through the larger galaxy could have plunged through, poking a hole," said Helou. "But we don't know this for sure. It could also just happen to be aligned with a gap in the arms." Other dots in the picture are either nearby stars in our galaxy, or distant galaxies. This image was taken during Spitzer's "cold mission," which lasted more than five-and-a-half years. The telescope ran out of coolant needed to chill its infrared instruments on May 15, 2009. Two of its infrared channels will still work perfectly during the new "warm mission," which is expected to begin in a week or so, once the observatory has been recalibrated and warms to its new temperature of around 30 Kelvin (about minus 406 degrees Fahrenheit).

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology, also in Pasadena. Caltech manages JPL for NASA. Spitzer's infrared array camera, which made the observations, was built by NASA's Goddard Space Flight Center, Greenbelt, Md. The instrument's principal investigator is Giovanni Fazio of the Harvard-Smithsonian Center for Astrophysics.

<http://www.sciencedaily.com/releases/2009/08/090804095939.htm>

### **Allgemeine Infos über Spitzer:**

[http://www.nasa.gov/mission\\_pages/spitzer/multimedia/index.html](http://www.nasa.gov/mission_pages/spitzer/multimedia/index.html)