



A dusty haze around blue compact dwarf galaxies

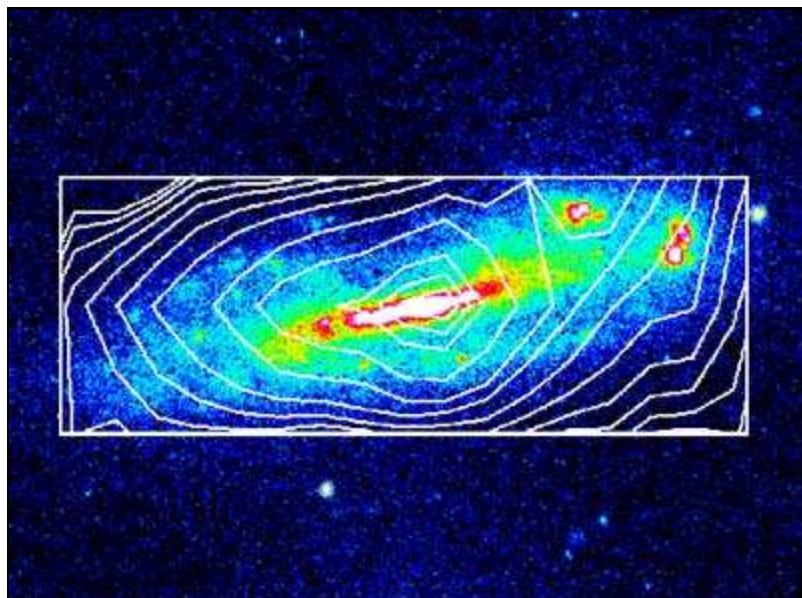
MAX PLANCK INSTITUTE NEWS RELEASE

Posted: May 12, 2002

Max-Planck scientists have discovered large amounts of ultra-cold cosmic dust in the Virgo Cluster. Up to 50 percent of stellar light in galaxies is transformed into infrared light.

Just as dust in the earth's atmosphere causes the setting sun to dim and glow red, so dust in galaxies shows its presence by preferentially blocking out the blue components of light emitted from stars. But just how much dust is in galaxies, and how much of the starlight is blocked out?

To answer these questions Dr Richard J. Tuffs, Dr. Cristina C. Popescu, Dr. D. Pierini and Prof. Heinrich J. Völk of the Astrophysics department of the Max-Planck-Institute for Nuclear Physics in Heidelberg, in cooperation with scientists from foreign institutes, have measured the infrared brightness of spiral and dwarf galaxies in the Virgo cluster.



The Virgo cluster spiral galaxy NGC4178. The colors show the brightness of the optical light from stars in this galaxy, ranging from blue (faint) through green and yellow and red to white (bright). The contours are lines of equal infrared brightness from dust, as observed using ISO within the rectangular box. Photo: Max-Planck-Institute for Nuclear Physics

They discovered surprisingly large quantities of cold dust,

Apollo patches

The Apollo Patch Collection: Includes all 12 Apollo mission patches plus the Apollo Program Patch. Save over 20% off the Individual price.,

■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)



Apollo patches

The Apollo Patch Collection: Includes all 12 Apollo mission patches plus the Apollo Program Patch. Save over 20% off the Individual price.,

[U.S. STORE](#)



typically ten times that previously known (The Astrophysical Journal, March 2002). Furthermore, estimates of the total amount of light emitted by the stars in the galaxies must now be revised sharply upwards, since the same observations show that up to 50 percent of the visible and ultraviolet light is being transformed into infrared radiation undetectable with human eyes. On top of this, analysis of the infrared emission indicates that some blue compact dwarf galaxies are surrounded by huge conglomerations of cosmic dust, quite possibly tracing intergalactic gas streaming down into the galaxies and giving rise to new generations of stars.

The possible effects of dust on the optical appearance of galaxies have preoccupied astronomers ever since Edwin Hubble realised 70 years ago that our Milky Way is just one galaxy amongst many in the universe. Direct observations of dust are needed to understand how much starlight is being released into the universe, what its colour is, and, therefore, what sort of stars were being formed through history in galaxies like our own Milky Way.

The team of Max-Planck scientists tackled this issue by measuring the brightness of galaxies in the invisible infrared spectrum of light expected from the dust particles blocking the visible starlight. They pointed ESA's Infrared Space Observatory (ISO) at 63 spiral and dwarf galaxies in the nearby Virgo cluster, carefully chosen to be representative of the overall population of galaxies in the local universe. Making use of ISO's unprecedented sensitivity at very long infrared wavelengths, this work represents the first statistical "census" of the total infrared energy output from "normal" galaxies.

Unexpectedly large amounts of infrared emission were discovered from very cold dust particles in almost all the galaxies measured. An example is shown in the picture, where the infrared emission from the spiral galaxy NGC4178 is depicted as contours overlaid on an image of the optical light. Remarkably, the temperature of the cold dust measured in the Virgo galaxies was found to range down to just ten degrees above absolute zero (-263 degrees Centigrade). As a consequence, astronomers are having to revise upwards by a factor of typically 10 the weight of dust in these galaxies compared to previous measurements. The data also show that up to half the total energy output of stars in normal galaxies

Expedition 16 crew patch

The official embroidered patch of the International Space Station Expedition 16 crew is now available to U.S. customers from our store.



■ [U.S. STORE](#)

Columbus mission patch

The official astronaut embroidered patch of Atlantis' STS-122 mission that launched the Columbus science lab in February is available to U.S. customers from our store.



■ [U.S. STORE](#)

Project Orion

The Orion crew exploration vehicle is NASA's first new human spacecraft developed since the space shuttle a quarter-century earlier. The capsule is one of the key elements of returning astronauts to the Moon.



■ [U.S. STORE](#)

The ultimate Apollo 11 DVD

This exceptional chronicle of the historic Apollo 11 lunar landing mission features new digital transfers of film and television coverage unmatched by any other.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Soviet Space

For the first time ever available in the West. Rocket & Space Corporation Energia: a complete pictorial history of the Soviet/Russian Space Program from 1946 to the present day all in full color. Available from our store.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

has been converted from visible optical into infrared photons, much more than previously suspected, necessitating an upwards revision in the total amount of emitted starlight.

But the biggest surprise was caused by the so-called Blue Compact Dwarf galaxies in the Virgo cluster. These are so called because when viewed with an optical telescope they are smaller than a tenth of the size of our own galaxy, and dominated by newly born massive blue stars, each shining up to 10,000 times more brightly than the sun. It had previously been supposed that dust exposed to this intense light should be very warm. The ISO observations, however, revealed huge amounts of very cold dust, in fact the coldest found from all the observed galaxies in the Virgo cluster. The scientists propose that this dust is so cold because it surrounds the galaxy, far away from the stars. They believe that "the infrared eyes of ISO may be tracing a dusty mixture of intergalactic gas, which the galaxies are still accumulating, leading to their further evolution."

Viking patch

This embroidered mission patch celebrates NASA's Viking Project which reached the Red Planet in 1976.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Apollo 7 DVD

For 11 days the crew of Apollo 7 fought colds while they put the Apollo spacecraft through a workout, establishing confidence in the machine what would lead directly to the bold decision to send Apollo 8 to the moon just 2 months later.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Gemini 12

Gemini 12: The NASA Mission Reports covers the voyage of James Lovell and Buzz Aldrin that capped the Gemini program's efforts to prove the technologies and techniques that would be needed for the Apollo Moon landings. Includes CD-ROM.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Mission Report

Space Shuttle Flights 1-5: The NASA Mission Reports covers the shuttle through its test flight stage and on to the first operational flight. Includes CD-ROM.



■ [U.S. STORE](#)
 ■ [WORLDWIDE STORE](#)

Gemini 7

Gemini 7: The NASA Mission Reports covers this 14-day mission by Borman and Lovell as they demonstrated some of the more essential facts of space flight. Includes CD-ROM.



■ Choose your store:
[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Apollo patches

The Apollo Patch



Collection: Includes all 12 Apollo mission patches plus the Apollo Program Patch. Save over 20% off the individual price.



■ Choose your store:

[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Mars Rover mission patch

A mission patch featuring NASA's Mars Exploration Rover is available from our online.



■ Choose your store:

[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Apollo 9 DVD

On the road to the moon, the mission of Apollo 9 stands as an important gateway in experience and procedures. This 2-DVD collection presents the crucial mission on the voyage to the moon.



■ Choose your store:

[U.S.](#) - [U.K.](#) - [E.U.](#) - [Worldwide](#)

Hubble Posters

Stunning posters featuring images from the Hubble Space Telescope and world-renowned astrophotographer David Malin are now available from the Astronomy Now Store.



■ [U.S. STORE](#)

■ [U.K. & WORLDWIDE STORE](#)

Get e-mail updates

Sign up for our *NewsAlert* service and have the latest news in astronomy and space e-mailed direct to your desktop (privacy note: your e-mail address will not be used for any other purpose). Enter your e-mail address:

Subscribe

[INDEX](#) | [PLUS](#) | [NEWS ARCHIVE](#) | [LAUNCH SCHEDULE](#)
[ASTRONOMY NOW](#) | [STORE](#)
[ADVERTISE](#)

© 2008 Pole Star Publications Ltd