

Giant mirror in space

THE SPACE OBSERVATORY HERSCHEL:
THROWING LIGHT ON WORLDS BURIED DEEP IN THE UNIVERSE



The largest space mirror **[3.5 meters in diameter]** is going to study the evolution of galaxies and the mystery of the birth of stars.

Expected launch of the satellite:
May 2009 by an Ariane-5 rocket from the Kourou base in French Guyana.

SEE THE YOUNG AND DISTANT WORLDS OF THE UNIVERSE

Beyond our Galaxy, the *Milky Way*, the Universe contains billions of other galaxies in which stars are born at more or less faster rates.

By observing these distant galaxies, the space telescope *Herschel* will measure the quantity of stars born in the Universe at each instant of its history, at present and as far back as 10 billion years in the past.

Image in visible light (up) and infra-red light (down) of the Messier 81 galaxy* located in the Great Bear constellation, 12 million light-years from Earth. The areas where stars are formed are the most luminous parts of the infra-red image.

mystery

HOW WERE GALAXIES FORMED WHILE THE UNIVERSE WAS STILL YOUNG?
HOW ARE STARS AND PLANETS FORMED WITHIN THESE GALAXIES?

During their formation, stars and planets are buried in clouds of gas and dust in which they are born. The centers of galaxies are also veiled by a large quantity of dust. Observation by infra-red light makes it possible to probe the interiors of these dust clouds. That is the objective of the European *Herschel* Observatory, the largest infra-red satellite ever launched. It will be able to see stars being formed in our Galaxy's clouds and obtain an overall view of the formation of stars in distant galaxies. It will also study the chemistry of the interstellar environment of galaxies, comets and the solar system.

Zoom

The *Herschel* satellite is 7.5 m in height on a 4x4 m base and weighs 3.3 tons. Three instruments placed on the focal plane of the large mirror will observe the galaxies' infra-red radiation: *PACS*, a bolometer array camera to map the infra-red emission of dust particles, *HIFI*, a dedicated high-resolution spectrometer for studying the Universe's chemistry, and *SPIRE*, which fulfills the same functions as *PACS* but at longer wavelengths, in submillimetric infra-red.

To prevent being blinded by the infra-red rays emitted by the Sun and by the heat of its own components, the instruments on board the satellite are protected from sunlight by an immense sunshade and are cooled to -270 degrees, just 3 degrees above absolute zero.

Model of the *Herschel* (above) and *Planck* (below) satellites in the fairing of the Ariane-5 rocket

