

# Herschel

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## Abstract

Herschel, short for the 'Herschel Space Observatory', is the fourth 'cornerstone' mission in the ESA science programme, with substantial NASA involvement. It will perform photometry and spectroscopy in approximately the  $57 - 670\mu\text{m}$  range. It will have a radiatively cooled 3.5m diameter telescope, and a science payload complement of three instruments housed inside a superfluid helium cryostat.

Herschel is designed to observe the 'cool universe'; it has the potential of discovering the earliest epoch proto-galaxies, revealing cosmologically evolving AGN/starburst symbiosis, and unravelling the mechanisms governing the formation of stars and planetary systems, such as our own.

Herschel will be operated as an observatory facility offering three years of routine observations. It will be available for the entire scientific community, with roughly two thirds of the observing time being 'open time', which will be offered through a standard competitive proposal procedure.

Herschel will provide with a unique view of the IR and submillimeter universe. Its instruments are designed for very precise measurements. However, the accuracy of the molecular data - spectroscopy, excitation cross section, radiative transfer models, reaction cross sections - will be the limiting factor in the analysis and interpretation of this data. Europe has started an ambitious laboratory and theoretical program in the area of molecular astrophysics to provide the basic molecular physics data required for proper interpretation of the Herschel results. To this end, the Molecular Universe, a consortium of 21 institutes in 9 countries, has been funded by the European Commission under the Marie Curie FP6 program. The results of this program will be made available to the community through data bases and web-interfaces. In this talk I will review the status of Herschel, the molecular physics program required for the analysis and interpretation of its data, and the Molecular Universe program. Major areas of concern will be identified.

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