

# The Canada-France-Hawaii Telescope

## – Fast Facts



The Canada-France-Hawaii Telescope (CFHT) is a joint facility of the National Research Council of Canada, the Centre National de la Recherche Scientifique of France, and the University of Hawaii, as established through a tripartite agreement signed in 1974. Its telescope is located on the summit ridge of Maunakea, a 4200 meter, dormant volcano on the Island of Hawaii. CFHT headquarters are in Waimea-Kamuela. CFHT is dedicated to the exploration of the Universe through observation.

### The telescope

CFHT's telescope, with its 3.6-m diameter mirror, became operational in 1979.

Once one of the largest telescopes in the world, CFHT, in spite of its age and nowadays modest size, remains at the forefront of astronomy thanks to the quality of its site, its state-of-the-art instrumentation, the quality of the services offered to its users, and the dedication of its staff.

### Did you know?

Total mass of the telescope:	325 tons
Mass of the mobile section:	250 tons
Mirror mass	14 tons
Mirror focal length	13.5 m
Dome mass	580 tons
Dome diameter	32 m
Total height of the building	38 m
Tripartite agreement signed	6/20/74
First light of the telescope	8/6/79
Telescope inauguration	9/28/79
Waimea facility	10/15/82



### Using the telescope

CFHT's main users are scientists from Canada, France, and Hawaii. Collaborative agreements also offer access to the telescope by the astronomical communities of Taiwan, Brazil, and China. Access is granted following a competitive process based on the scientific quality of the proposals and their adequacy to the telescope.

In the early days, astronomers used to come to perform their own observations. CFHT staff astronomers and observers are now handling the observations for all the users (service observing), insuring that the telescope is used in the most efficient way by observing a given program when the conditions suit it best (queue mode), always prioritizing the observations by their ranking.

Observing at the summit is difficult due to the altitude and remoteness of Maunakea. CFHT is now operated remotely from Waimea by a single remote observer, without anyone at the summit at night.







## Outreach

Education is one of the important missions of the observatory. From star gazing sessions for the public to staff visits to schools or participation in local events, CFHT is an active player in science and astronomy outreach in the local community.

## Wide-Field Imaging

Since the early days of the observatory, wide-field imaging **in the visible light** has been a trademark of the observatory. It started in the early 80's with photographic plates, but quickly moved to CCDs, the detectors used in today's digital cameras.

More than a decade of development of greater and greater mosaics of CCDs culminated in 2003 with MegaCam, which covers a field of 1 degree by 1 degree on the sky, or 2 by 2 full moons, with an excellent image resolution, thanks to its pixel size which makes good use of the excellent quality of the sky over Mauna Kea. MegaCam offers excellent images used for a wide range of studies, from

asteroids close to Earth or in the outskirts of our solar system to remote galaxies, looking at the large scale structures of the Universe, contributing to a better understanding of dark matter or dark energy, or studying the Milky Way (our own galaxy) or the past of some of our neighboring galaxies like Andromeda,

**Near-infrared light** (near-IR) is an important complement to visible light. Thanks to recent developments in infra-red detectors, CFHT is offering a wide-field near-IR camera, WIRCam. Together with MegaCam observations, WIRCam allows to observe further away in the Universe.

### MegaCam

36 CCD detectors  
340 MegaPixels  
1 deg x 1 deg field of view  
0.18 arcsecond pixels

### WIRCam

4 H2RG detectors  
16 MegaPixels  
20' x 20' field of view  
0.3 arcsecond pixels



### > The Orion Nebula

On the left, seen by MegaCam in visible light, and on the right by WIRCam in near-infrared. Clouds of dust are more transparent in the infrared and stars, usually hidden by dust, are now visible.

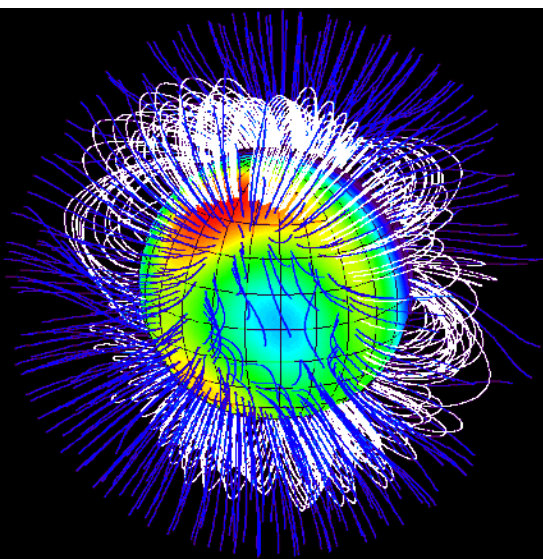
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## Studying Stellar Magnetism



With ESPaDOnS, the only high-resolution spectro-polarimeter available on 4-m class or larger telescopes, astronomers can now observe with unprecedented details the magnetic field around stars, opening information on the physics of stars that was previously only available for our closest star, the Sun.

> **Magnetic field around  $\tau$  Scorpii**



## Preparing the future

Two instruments will contribute to maintain CFHT at the forefront of astronomy up to the end of the decade: - **SITELLE**, an imaging FTS over a 15' field of view, on the sky before the end of 2013. - **SPIROU**, a spectro-polarimeter like ESPaDOnS, but in the near-IR (up to K), offering 1m/s radial velocity measurements for the search for extrasolar planets, for 2016. **IMAKA**, a wide-field imager with ground-layer AO and exquisite image quality, is under study.

CFHT is preparing for the next decade a concept of large (10m) telescope dedicated to wide-field multi-object spectroscopy, currently under study: an exciting project which could potentially gather nations from the Asian-Pacific region to the CFHT observatory.