MASTER-IAC @ Teide Observatory

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MASTER-Net workshop, Moscow 13-17 August 2012
The Canary Islands
The Canary Islands belong to Spain but are located in the Atlantic, about 100 km on the west coast of Africa. The archipelago comprises 7 islands, the biggest is Tenerife where MASTER-Net will be located.
1) Instituto de Astrofísica de Canarias (IAC), La Laguna, Tenerife:
   - 400 persons: ~1/3 research, ~1/3 instrumentation, ~1/3 administration
   - Largest institute in astronomical research in Spain
   - Headquarters located in La Laguna, Tenerife

2) Observatorio del Roque de los Muchachos (ORM), La Palma:
   - 17º 53' 33" West, 28º 45' 25" North, altitude 2396m, 185 hectares
   - Large optical and NIR telescopes
   - World-largest optical telescope: the Gran Telescopio de Canarias (GTC)

3) Observatorio del Teide (OT), Tenerife:
   - 16º 30´ 35" West, 28º 18´ 00" North, altitude 2390m, 50 hectares
   - Small optical and NIR telescopes
   - Largest solar telescopes in Europe
ORM Instrumentation

1) Large optical+NIR telescopes
   - 10.4-m Gran Telescopio de Canarias
   - 4.2-m William Herschel Telescope
   - 3.5-m Telescopio Nazionale di Galileo
   - 2.56-m Nordic Optical Telescope
   - 2.5-m Isaac Newton Telescope
   - 2-m Liverpool Telescope

2) Small telescopes
   - 45-cm DOT telescope
   - 20-cm SuperWASP telescope
   - 18-cm Automatic Transit Circle

3) Other telescopes
   - 17-m MAGIC Gamma-ray telescope
   - 1-m Swedish solar telescope
Teide Observatory: Instrumentation (I)
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- **FastCam**: Lucky Imaging camera giving diffraction-limited images over a 12 arcsec FOV
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   - **TCP:** Tromsoe high-speed CCD photometer
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Science
Scientific Interests @ IAC

- **Brown dwarfs** (*Rafael Rebolo’s group*)
- **Planets**: transits, follow-up of M dwarfs (*Garik Israeliian*)
- **Planets** around White Dwarfs (*Arturo Manchado*)
- **Small body science**: TNOs (*Javier Licandro*)
- **Particle Astrophysics** group (*Ramón García López*): complementary optical photometry of GRBs valuable
- **Asteroseismology** of Main Sequence pulsators only if dedicated periods can be set-up (*Katrien Uytterhoeven*)
Scientific Highlight

MASTER auto-detection system at Tunka (Baykal Lake)
Transient related to the Brown Dwarf 2MASS J17285995+7518436

Discovery Image

2011-05-12 18:24:47.7 UT

Tunka Reference Image

2010-09-06 13:42:27 UT
My Personal scientific interests

1) The nearest and coolest brown dwarfs to the Sun:
   - ε Indi B: the nearest binary brown dwarf @ 3.6 pc
   - Benchmark objects: companions to stars with known g & [Fe/H]
   - Cool brown dwarfs with Teff ~ 500-600 K

2) The universality of the Initial Mass Function:
   - Clusters: is the IMF universal?
   - Local IMF: complete census in the Solar neighbourhood
   - Fragmentation limit: search for T-type brown dwarfs in clusters

3) Metal-poor low-mass stars and white dwarfs

4) Large-scale surveys: 2MASS, SDSS, UKIDSS, VISTA, WISE
Video: El cielo de Canarias

http://vimeo.com/23205323
Memorandum of Understanding
The SAI-IAC MoU: Introduction

IAC’s Teide Observatory will become one of the nodes of the MASTER-Net global project. The MASTER-Net project will consist of a series of eight 2x400 mm robotic telescopes.

To measure the polarization and multi-colour properties of the prompt optical emission of GRBs, the MASTER-Net project requires a global network at premier sites. The main goal of this project is to produce a unique fast sky survey with all sky observed over a single night down to a limiting magnitude of 19-20. Such a survey will address a number of fundamental problems: search for dark energy via the discovery and photometry of supernovae (including SNIa), search for exoplanets, microlensing effects, discovery of minor bodies in the Solar System, and space-junk monitoring. All MASTER telescopes can be guided by alerts and the intention is to observe prompt optical emission from gamma-ray bursts synchronously in several filters and in several polarization planes.

The Canary Islands are an ideal location for one of the Network’s telescopes, not only for the internationally recognized quality of the Teide Observatory’s night sky, which makes this node one of the most efficient, but also because of its geographical location. This site will allow to significantly extend the Network in the western direction and to reach the 11h coverage of longitudes. Finally, the first-rate infrastructure and the opportunities for outstanding scientific interactions make the IAC and Teide Observatory a perfect host for one of the MASTER network nodes.
MoU: Infrastructure (I)

MSU will contract:

1) Construction of a steel-reinforced concrete platform approximately 3.8m by 3.8m in size, and a vibration isolated pier 80 cm square and 3.2m high located near the centre of the platform

2) Construction and installation on this concrete foundation of the under-dome building for housing the Telescope equipment and its weather protection. From inside of this building there will be an access to the second level provided with help of a louvers and a ladder.

3) provision of a dome, 3.6m in diameter and 2.8m in height, to house the Telescope and its installation on top of this building
MoU: Infrastructure (II)

Dome

Telescope
MoU: Services

The MASTER-IAC Project installation is expected to require the following levels of common services:

1) 4000 Watts of power AC 220-230 V
2) Internet connection capable of not less than 10Mbit/s exchange rate bidirectional
3) Fixed IP with external access possibility
4) Access to Teide observatory meteo service

MSU and the IAC’s Technology Division intend to establish a Service Contract for the maintenance and operation of the MASTER-IAC.
1) MSU & IAC responsible scientists, will be entitled to authorship on scientific papers

2) MASTER-IAC participating scientists, will be entitled to access all of the data from the entire network as well as software

3) MSU and IAC shall endeavor to ensure that when publications, webpages and press releases refer to the MASTER-IAC that it is identified as part of the collaboration of MSU and the IAC

4) Appropriate acknowledgements should be included in papers and press releases indicating that data have taken by MASTER-IAC based on Teide Observatory
MoU: Outreach

1) MSU and the IAC will cooperate in an effort to assure that mutual benefits for science, education, and MSU/IAC collaboration are derived from this MoU.

2) The MSU and the IAC will seek to offer educational benefits through involvement of graduate students or postdocs in the operation of the MASTER-IAC Project as well as in the analysis and interpretation of its observations.

3) MSU will make, on a continuing basis, an annual contribution to the IAC postdoctoral researcher program of 5,000 Euros

4) The IAC scientist-spokesperson will be expected to spend a small fraction of his or her time performing liaison duties among the sites; he will be trained in the fundamental goals and operating principles of MASTER-IAC. The MSU strongly encourages exchange visits among the sites and may invite relevant IAC staff to visit it and shall endeavour to fund the associated travel costs.
Muchas gracias
Thanks a lot
спасибо (spasibo)