CARMENES

The new exoplanet hunter at Calar Alto
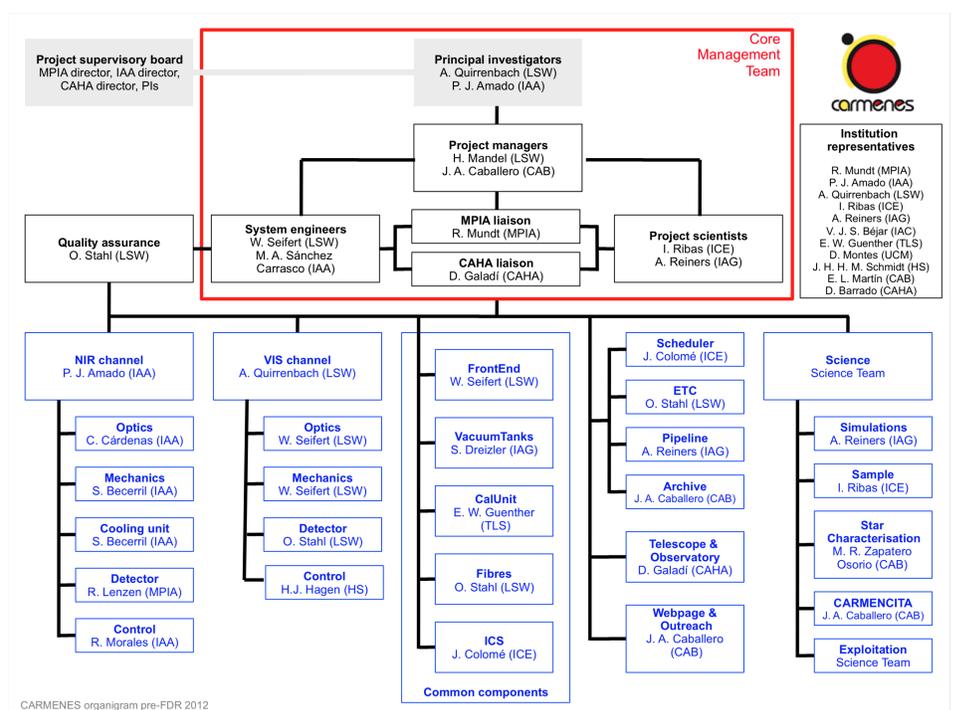
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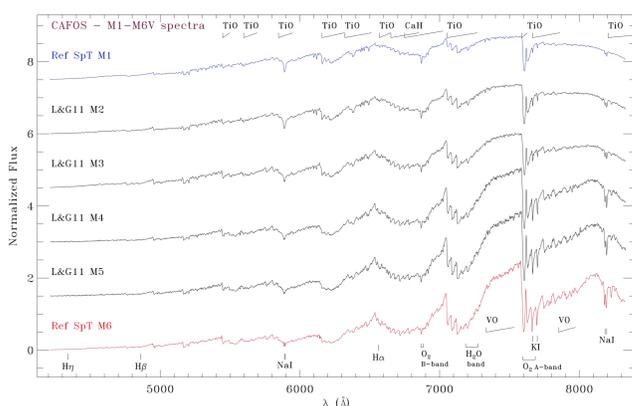
Our URL: **http://carmenes.caha.es/**

CARMENES (Calar **A**lto high-**R**esolution search for **M** dwarfs with **E**xoplanets with **N**ear-infrared and optical **E**chelle **S**pectrographs**)** is a next-generation instrument to be built for the 3.5 m telescope at the Calar Alto Observatory by a consortium of German and Spanish institutions. It consists of two separated spectrographs covering the wavelength ranges from 0.5 to 1.0 μm and from 1.0 to 1.7 μm with a spectral resolution R=82,000, each of which shall perform high-accuracy radial-velocity measurements (~1 m s^{-1}) with long-term stability. The fundamental science objective of CARMENES is to carry out a survey of (~300) late-type main-sequence stars with the goal of detecting low-mass planets in their habitable zones. We aim at being able to detect 2 M$_{Earth}$ planets in the habitable zone of M5V stars. The CARMENES first light is expected to occur in Spring 2014.

Basic engineering parameters	NIR channel	VIS channel
Δλ [μm]	0-95-1.70	0.55-1.05
Working T [K]	~140	~295
Detector(s)	2 x 2kx2k Hawaii 2-RG (2.5 μm)	1 x 4kx4k e2v CCD231-84
Calibration lamps	U-Ne	Th-Ar-Ne
Optical parameters	R=82,000, 2.8-pix sampling (>2.3 pix), 7-pix inter-fibre spacing	

CARMENES organigram pre-FDR 2012

Advantages of CARMENES: Simultaneous near-infrared and visible observations (to discriminate between exoplanets and stellar activity) • Instrument optimised (and mostly dedicated) to stable high-precision radial-velocity survey of exoplanets around M dwarfs • Long guaranteed time for the completion of the project (between 600 and 750 useable nights at the 3.5 m telescope for five years) • Avoid the complications of cryogenics (focus on red optical and *YJ* bands) • Pipeline-reduced data to be provided to the entire astronomical community after a proprietary time through a web-based archive • Flexible observations (common front-end with PMAS) • High resolution and wide spectral coverage, *useful for other Astrophysical purposes*.

The CARMENES Science Working Group is defining and carrying out a preliminary characterisation of the CARMENES input catalogue, which will consist of the brightest, latest M dwarfs in the Northern Hemisphere with the lowest *vsini* values. For that, we are compiling numerous published parameters and obtaining low- and high resolution spectroscopy with CAFÉ, CAFOS (left) and FEROS, and lucky imaging with FastCam, of hundreds of potential M-dwarf CARMENES targets.