

carmenes

The new exoplanet hunter at Calar Alto

J. A. Caballero^{co-PM}, A. Quirrenbach^{PI}, P. J. Amado^{co-PI}, H. Mandel^{PM}, W. Seifert^{SE}, M. A. Sánchez Carrasco^{co-SE}, R. Mundt^{MPIA}, I. Ribas^{PS}, A. Reiners^{co-PS} and the CARMENES Consortium^{1,2,3,4,5,6,7,8,9,10,11}

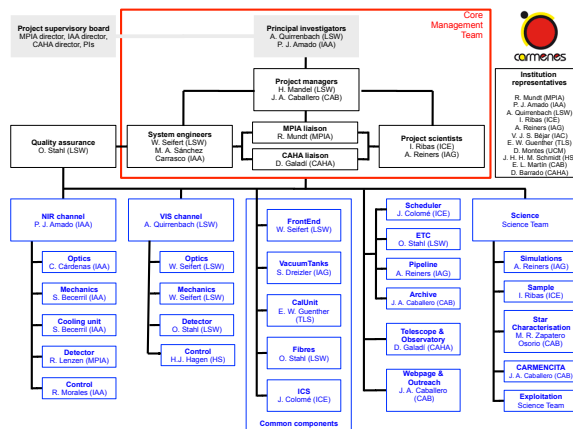


¹Max-Planck-Institut für Astronomie • ²Instituto de Astrofísica de Andalucía • ³Landessternwarte Königstuhl • ⁴Institut de Ciències de l'Espai • ⁵Institut für Astrophysik Göttingen • ⁶Instituto de Astrofísica de Canarias • ⁷Thüringer Landessternwarte Tautenburg • ⁸Universidad Complutense de Madrid • ⁹Hamburger Sternwarte • ¹⁰Centro de Astrobiología • ¹¹Centro Astronómico Hispano-Alemán – Calar Alto Observatory



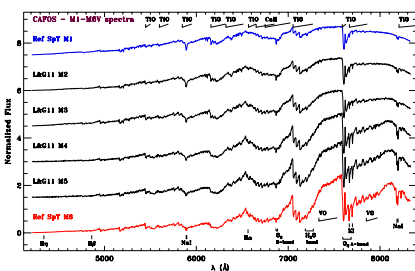
CARMENES (Calar Alto high-Resolution search for M dwarfs with Exoplanets with Near-infrared and optical Echelle Spectrographs) is a next-generation instrument to be built for the 3.5 m telescope at the Calar Alto Observatory by a consortium of German and Spanish institutions. It consists of two separated spectrographs covering the wavelength ranges from 0.5 to 1.0 μm and from 1.0 to 1.7 μm with a spectral resolution $R=82,000$. The spectrographs will be fed by fibres from the Cassegrain focus of the telescope, housed in a temperature-stabilized environment in the coudé room, mounted on benches in vacuum tanks and calibrated using simultaneous emission lamps. Conducting a five-year exoplanet survey targeting ~ 300 M dwarfs with the completed instrument is an integral part of the project. With CARMENES, we expect to detect super-Earths of $\sim 5 M_{\oplus}$ or less, some of which may be in the habitable zone or transiting. Our URL: <http://carmenes.caha.es/>

	NIR channel	VIS channel
$\Delta\lambda$ [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 CCD 231-84
Optical parameters	R=82,000, 2.8-pix sampling (>2.3 pix), 7-pix inter-fibre spacing	



	Milestone
Mar 2008	call for letters of intent for the construction of next-generation instruments at Calar Alto
Feb 2009	start of the CARMENES project
May 2010	secured funding and CAHA green light
Jul 2011	preliminary design review
Apr 2012	optics final design review
\sim Jan 2014	first light

Advantages of CARMENES: Simultaneous near-infrared and visible observations (to discriminate between exoplanets and stellar activity) • Instrument optimised and 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 $v \sin i$ values. For that, we are compiling numerous published parameters and obtaining low- and high resolution spectroscopy with CAFÉ, CAPOS (left) and FEROS, and lucky imaging with FastCam, of hundreds of potential M-dwarf CARMENES targets.

