EMBARGO CONDITIONS: This press release is EMBARGOED until 22/02/2023 at 10:00 am Central European Time (CET)

CARMENES project boosts the number of known planets in the solar neighbourhood

**20,000 observations from the Calar Alto telescope in Spain are made public, and have led to the discovery of 59 planets, some of them potentially habitable**

**The study, led by a consortium of Spanish and German institutions, has the prominent participation of IEEC researchers**

**The instrument has proven to be a success and will continue to provide information on small cool stars until at least the end of 2023**

The [CARMENES](https://carmenes.caha.es/) project has just published data from about 20,000 observations taken between 2016 and 2020 for a sample of 362 nearby cool stars. The project, financed by Spanish and German funds, uses an instrument at [Calar Alto Observatory](https://carmenes.caha.es/) (Spain) with the purpose of **finding Earth-like exoplanets (rocky and temperate), with the possibility of harbouring water on their surface** if they are located in the so-called "habitable zone" of their star. Notable among the multitude of released data measurements are those that have led to the **discovery of 59 exoplanets, a dozen of which are potentially habitable**. The study has been published today in the journal Astronomy & Astrophysics.

CARMENES is the name of the scientific project, but also of the instrument used to make the observations and of the consortium that designed and built it. More than 200 scientists and engineers from **11 Spanish and German institutions** are involved in the project, in which researchers from the [Institute of Space Studies of Catalonia](https://www.ieec.cat/) (IEEC — Institut d’Estudis Espacials de Catalunya) at the [Institute of Space Sciences](https://www.ice.csic.es/) (ICE-CSIC) have a prominent role. In fact, the Director of the IEEC, **Ignasi Ribas**, is the first author of this recently published work. He is accompanied by about a hundred experts from more than 30 research centres, including the other institutions of the consortium: the [Max-Planck-Institut für Astronomie](http://www.mpia.de) (MPIA), the [Instituto de Astrofísica de Andalucía](https://www.iaa.csic.es/) (IAA-CSIC), the [Landessternwarte Königstuhl](https://www.lsw.uni-heidelberg.de/) (LSW), the [Institut für Astrophysik Göttingen](http://www.uni-goettingen.de/de/203293.html) (IAG), the [Universidad Complutense de Madrid](https://www.ucm.es/) (UCM), the [Thüringer Landessternwarte Tautenburg](http://www.tls-tautenburg.de) (TLS), the [Instituto de Astrofísica de Canarias](https://www.iac.es/) (IAC), the [Hamburger Sternwarte](http://www.hs.uni-hamburg.de) (HS), the [Centro de Astrobiología](https://cab.inta-csic.es/) (CAB, CSIC-INTA) and the [Centro Astronómico Hispano-Alemán](http://www.caha.es) (CAHA).

The **CARMENES instrument** is an optical and near-infrared spectrograph, i.e. **a** **device that measures both visible and infrared light from the objects it is pointing at**. It was installed in 2015 at Calar Alto Observatory with the aim of **finding terrestrial-type exoplanets in nearby cool stars** (the so-called red dwarfs). The light collected from a given star (the stellar spectrum) can give away the presence of exoplanets, as it allows to measure the small motions of the star produced by the gravitational pull of the planets orbiting it.

The high-resolution spectra obtained with CARMENES are used to determine the velocity of the star with an accuracy of one metre per second, which is a major technological challenge. This makes it possible to find small planets around low-mass stars.

"Since it came into operation, CARMENES has re-analysed 17 known planets and has discovered and confirmed 59 new planets in the vicinity of our Solar System, making a significant contribution to expanding the census of nearby exoplanets," explains Dr Ribas. In fact, **this instrument has boosted the number of exoplanets we know about around nearby cool stars** by doubling those detected with the previously described method. It is to be hoped that, with the publication of this first large dataset, the research community will analyse it and will be able to further increase its scientific output. Importantly, **CARMENES has observed almost half of all nearby small stars** (a part of them can only be observed from the southern hemisphere). In addition, the spectra obtained also provide **extremely valuable information about the atmospheres of the stars and their planets**, among other features.

The paper published in Astronomy & Astrophysics is **the 100th article of the CARMENES consortium**, which shows how successful the project has been in providing information about Earth-like exoplanets and their stars. In this study, the visible-light data have been released. Experts are still improving the processing of the infrared data, so when they are published, astronomers will have a second large set of observations to work with.

The CARMENES project continues in **CARMENES Legacy-Plus**, which started in 2021 and keeps taking more observations of the same stars. “In order to determine the existence of planets around a star, we observe it a minimum of 50 times,” explains **Juan Carlos Morales**, IEEC researcher at ICE-CSIC. He adds: “Although the first round of data has already been published so that the scientific community can access them, the observations are still ongoing.” The observations made in this project extension will continue at least until the end of 2023.

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**More information**

This research is presented in a paper entitled “[The CARMENES search for exoplanets around M dwarfs. Guaranteed Time Observations Data Release 1 (2016-2020)](https://www.aanda.org/10.1051/0004-6361/202244879)”, by I. Ribas, A. Reiners *et al.*, to appear in the journal Astronomy & Astrophysics on 22 February 2023.

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