1. *Interested institution:*

The Spanish National Research Council (CSIC). C/ Serrano 117, 28006, Madrid (Spain)
www.csic.es

Instituto de Astrofísica de Andalucía (IAA_CSIC), Granada
http://www.iaa.es/es

2. *Brief Description of the Institution*

The Spanish National Research Council (CSIC) is the largest public institution dedicated to research in Spain and the third largest in Europe. Belonging to the Spanish Ministry of Economy and Competitiveness through the Secretary of State for Research, Development and Innovation, its main objective is to develop and promote research that will help bring about scientific and technological progress, and it is prepared to collaborate with Spanish and foreign entities in order to achieve this aim. It has a staff of more than 13,000 employees, among these about 3,300 are permanent researchers and about 4,300 are pre- and post-doctoral researchers. The CSIC has 70 fully own institutes or centres distributed throughout Spain. In addition, it has 53 Joint Research Units with universities or other research institutions. There is also a delegation in Brussels and Rome.

CSIC has considerable experience in both participating and managing R&D projects and training of research personnel. Under the 7th Framework Programme CSIC has signed approximately 700 actions (including 97 coordinated by CSIC and 47 ERC projects). Funding wise, CSIC is listed the 1st organisation in Spain and the 5th in Europe in the 7th Framework Programme, with a total FP7 contribution of over 260 million euros. During the first calls of H2020, CSIC has had an intense participation in all programmes. It has been remarkable the participation in certain calls, such as ERC and Marie Curie, as well as in ICT, NMBP and Societal Challenges. In March 2015 CSIC has obtained 90 projects with a total financial contribution of 40 million euros.

The research line described in this expression of interest is carried out at the Instituto de Astrofísica de Andalucía (IAA), Granada. The IAA is one of the largest CSIC institutes, with >200 members. Research at the IAA covers all major fields of astrophysics, from quantum gravity, to the Solar System, stellar physics, star formation and exoplanets, to galaxy evolution and cosmology. There are four departments: Extragalactic Astronomy, Stellar Physics, Radio Astronomy and Galactic Structure, Solar System.

3. *Please tick the areas of research (as established in Marie Sklodowska Curie Actions)*

☐ Chemistry (CHE)	☐ Environmental Sciences and Geology (ENV)
☐ Social Sciences and Humanities (SOC)	☐ Life Sciences (LIF)
☐ Economic Sciences (ECO)	☐ Mathematics (MAT)
☐ Information Science and Engineering (ENG)	☒ **Physics (PHY)**

4. Research / Project Description

Search for terrestrial planets around cool stars with new-technology astronomical instruments

The closest stellar neighbour to our Sun and Solar System is Proxima Centauri. If Humankind ever needs a new Earth, any planetary system orbiting Proxima would be the first we would turn our eyes to.

But Proxima Centauri is not s solar-type star, but an M-type dwarf. M stars are the most abundant type of stars in our Galaxy, amounting to ~75% of all type of stars, and are the nearest in distance to our Sun (like Proxima Centauri, an M6Ve-type star that our group is already monitoring in search for planets). Therefore, M stars, on their own right, deserve more attention, that will, in turn, result in a deeper understanding of this type of object and of any exoplanet they may host. Furthermore, in the past few years, we have moved from perceiving the M stars as isolated systems, especially these in-average old stars, to knowing that, according to observations, all of them may have a planetary system. This, what we could define as a change of paradigm, has taken stellar astrophysicist from having to study the stars alone to having to understand the whole stellar system formed by the star and their planets, or their proto-planets or disks if in an earlier evolutionary stage.

To understand the whole system we now need to know with sufficient precision the parameters and internal structure of the stars and understand the physical processes behind their variability, the formation and dynamics of planets around them and any possible interaction between planets and their host star. And, if possible, the evolution of the whole system should also be studied.

The main objective of the project we are carrying out in our group is searching for telluric exoplanets around M-dwarf stars in the solar neighbourhood. This will be achieved by exploiting the cutting-edge astronomical instruments CARMENES and PANIC. This research is supported by a project funded by the Spanish ministry which unifies the expertise of several research groups, both in Germany and in Spain, to tackle the challenge of deepening our knowledge about cool, red low-mass M stars and the pale blue tiny dots corresponding to any habitable planet they may host. This will be achieved by better understanding variability in this type of stars to discern the signals due to physical processes of stellar origin (like activity or pulsations) from those due to a planet orbiting the star. For that, the teams have designed, built and intent to exploit the two next-generation instruments for the CAHA observatory, CARMENES and PANIC, which are at the forefront of technological research.

CARMENES will be the first high-resolution (R=82,OOO) cross-dispersed spectrograph providing a large NIR wavelength coverage to be installed in a telescope. Having been built specifically to reach the precision, in the near infrared wavelength range, of 1 *m/s* in the radial velocity measurements of cool M dwarfs, our coordinated team will have a privileged position to search and discover rocky planets around those objects, including those in their habitability zone, where liquid water is expected. Furthermore, it will be the only instrument in the world providing simultaneous visible- and NIR-region coverage at such a high resolution.

The impact of its scientific results will most likely extend beyond the scientific community because finding rocky planets in the habitable zone of nearby stars is a topic of high scientific and philosophical interest for both scientists and common society.

5. Who can apply?

At the deadline for the submission of proposals (10/09/2015), researchers (*):

- shall be in possession of a doctoral degree or have at least four years of full-time equivalent research experience.
- must not have resided or carried out their main activities in the country of Spain for more than 12 months in the 3 years immediately prior to the abovementioned deadline.

6. Contact person

Pedro J. Amado, Instituto de Astrofísica de Andalucía (IAA-CSIC), Granada
pja@iaa.csic.es, Phone: +34 958 230 639

7. Applications: documents to be submitted and deadlines

Please note that:

- Deadline of the next call for proposals for Marie Sklodowska – Curie Individual Fellowships is **September, 10th 2015.**
- Oficina Europea is only responsible for the display of the expressions of interests received by the institutions; further contact and information requests will take place directly between the host institutions and the interested researchers.

(*) Further details on the Call and additional eligibility criteria can be found at the Participants´Portal