

# 2630

## Public Notice - International Selection Procedure

### PhD Scientific Researcher Recruitment

FCiências.ID/2018/DL57/IA/2

**FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências**, through its Chairman of the Board of Directors, hereby announces the opening of an international call for the recruitment of a scientific researcher with a PhD degree, within the scope of Project P-TUGA, ref PTDC/FIS-AST/29942/2017, in the form of an employment contract with an uncertain term, according to the Portuguese Labour Code and Decree-Law No. 57/2016, of August 29<sup>th</sup>, as amended by Law No. 57/2017, of July 19<sup>th</sup>, and complementary legislation.

#### I - Admission Requirements

Portuguese nationals, foreign and stateless persons may submit applications to this selection procedure, provided they hold a doctoral degree<sup>1</sup> in Astronomy and Astrophysics, have specialised skills and/or expertise in the field of planetary atmospheres, and fully comply with the following requirements:

- a) The PhD must have been granted at least 3 years ago.
- b) Demonstrated scientific and/or professional experience: in the area of atmospheric dynamics studies in solar system planets, Doppler velocimetry, high resolution spectroscopy based on long-slit spectroscopy and fiber-fed spectroscopes, dynamics studies based on the techniques of cloud tracking, preferably using techniques of phase correlation between images, proven experience in data analysis based in observations obtained from space probes and also from ground-based telescopes, the candidate must be experienced in the use of cloud-tracking methods in the ultraviolet, visible and infrared wavelength ranges. The candidate must have experience in wind velocity retrievals, and its cartography, both on the day side and on the night side of the planet Venus.
- c) The candidate must also have experience in astronomical observations of solar system bodies (spectroscopy and photometry), in particular in the case of Venus, Mars, Saturn and Titan, using high resolution (visible and infrared) spectroscopes and infrared cameras. Experience on observations and data reduction on observations of stellar occultations by asteroids and trans-neptunian bodies is preferred. Experience working in computer environments using MATLAB and IDL is preferred. Previous experience of observing and/or reducing data of objects in the Solar System, the level of knowledge in Planetary Sciences field of expertise, as well as a high degree of motivation, enthusiasm and ability to work as a team will be valued.

<sup>1</sup> Applicants with doctoral degrees obtained in foreign countries need, in accordance with Decree-Law No. 341/2007, of October 12<sup>th</sup>, as regulated by Government Order No. 227/2017, of July 25<sup>th</sup>, to be registered as holders of a doctoral degree, with all inherent entitlements. Applicants to whom, under the terms of Decree-Law No. 283/83, of June 21<sup>th</sup>, equivalence or recognition of the degree of Doctor has been granted are also valid. The presentation of the registration / recognition /equivalence certificate is mandatory for contract signature.

#### II. Applicable Law

1. Decree-Law No. 57/2016, of August 29<sup>th</sup>, in the wording conferred on it by Law No. 57/2017, of July 19<sup>th</sup> (RJE), taking also into account the provisions of Regulatory Decree No. 11-A/2017, of December 29<sup>th</sup>;
2. Portuguese Labour Code, as approved by Law No. 7/2009, of February 12<sup>th</sup>, in its current version (CT);
3. Administrative Procedure Code, as published in Decree-Law No. 4/2015, of January 7<sup>th</sup>, in its current version (CPA).

### III. Work Plan

The objectives of the work plan are:

Detailed work plan:

The focus of this research work plan in the dynamics of Venus' mesosphere with the Doppler velocimetry techniques that this project's team have developed and fine-tuned and with an improved cloud tracking method based in phase correlation between images [Machado2017]. In the framework of a new collaboration with the space mission Akatsuki the project's team prepared a ground-based support campaign. Part of it was already performed (CFHT/ESPaDOnS and TNG/HARPS, with coordinated Akatsuki's observations CFHT/ ESPaDOnS, TNG/HARPS-N and NICS, and VLT/UVES. Expected results: complete view of Venus' atmospheric circulation, including spatial and temporal variability, relation to topography, polar vortex activity, and comparison to General Circulation Models (Task 2). The successful candidate will retrieve Doppler and cloud-tracked winds

Better understanding the nature of the processes governing super-rotation in the atmosphere of Venus by complementing, with ground-based observations, the latitudinal distribution of zonal and meridional winds measurements of Venus atmosphere obtained by spacecraft (VEx and Akatsuki). The focus of this research work plan in the dynamics of Venus' mesosphere with the Doppler velocimetry techniques that this project's team have developed and fine-tuned and with an improved cloud tracking method based in phase correlation between images [Machado2017]. In the framework of a new collaboration with the space mission Akatsuki the project's team prepared a ground-based support campaign. Part of it was already performed (CFHT/ESPaDOnS and TNG/HARPS, with coordinated Akatsuki's observations CFHT/ ESPaDOnS, TNG/HARPS-N and NICS, and VLT/UVES. Expected results:

- Complete view of Venus' atmospheric circulation, including spatial and temporal variability, relation to topography, polar vortex activity, and comparison to General Circulation Models (Task 2). The successful candidate will retrieve Doppler and cloud-tracked winds. Goal included in project's Activity 1 (tasks 1 and 2) of P\_TUGA project.

- Studying the wind variability and the presence of atmospheric planetary waves on Venus using all dataset from two instruments on board VEx (VMC and VIRTIS), following previous studies led by team members [Machado2014; Peralta2014]. Goal included in project's Activity 1.

- Obtain a first 3D approximation of the Venus mesosphere's circulation, based on wind measurements at cloud-tops (~70 km) using Doppler methods and at the bottom of the cloud layer (~48 km) using infra-red cloud tracking. Goal included in project's Activity 1.

- Exploit and validate with the help of model simulations existing space and ground-based observations of Venus cloud tops (~ 70 km) and at the bottom of the cloud deck (~ 48 km) and analysis of observations taken in 2018 (VLT/UVES and CFHT/ESPaDOnS) and space-based observations from Akatsuki/UVI. Goal included in project's Activity 1.

Gravity waves: a key process in Venus and Mars middle/upper atmosphere.

- Perform dynamical studies on the Mars' atmosphere, namely studying the dynamics of the Martian atmosphere along a Global Dust Storm based in data obtained with VLT/UVES (visible) and CARMENES high-resolution spectrograph (infra-red), and space-based observations from Mars EXPRESS (ESA) VMC. Goal included in project's Activity 3.

- Characterize small scale waves on Venus and Mars atmospheres from observational approaches. Promote a close collaboration between space and ground based observations and modelling Teams in order to merge and critically compare the information obtained from different sources and increase the data-model synergies. Goal included in project's Activity 3 (tasks 1, 2 and 3). The successful candidate will work on the observational retrievals, data reduction and results interpretation. Expected results:

- detect mesospheric waves and identify their sources

- provide valuable observational constraints to GCMs to perform a proper fine-tuning of GW parameters.

- help interpret the observed variability on Venus and Mars middle atmosphere.

Doppler velocimetry techniques (UV-Vis) applied to Saturn and Jupiter. Take advantage of the project team Doppler velocimetry method to retrieve instantaneous wind velocities on other Solar System targets, as is the case of Jupiter, Saturn and complement observations by space missions. Goal included in project's Activity 4 (tasks 1, 2 and 3).

- Adapt the Doppler velocimetry method (successfully developed for the case of Venus) for the case of the Gas Giant planets, in order to provide wind measurements using visible spectra of solar radiation back-scattered at Jupiter's and Saturn's clouds. Perform cloud tracking techniques at space-based observations (Cassini/VIMS) in order to compare and cross-validate winds obtained with the Doppler method. Goal included in project's Activity 4.

- Adaptation of the team's Doppler velocimetry method to the infrared wavelength range, to sound deeper layers of the atmosphere of Jupiter and Saturn and planets radiation emission's contribution. Detect and characterize infrasound waves on Gas Giants. Goal included in project's Activity 5.

- Adapt the team's Doppler method to the high-resolution spectra of Saturn and Jupiter obtained with CARMENES spectrograph in the infra-red in order to retrieve wind velocity fields at this wavelength range. Goal included in project's Activity 5.

- The successful candidate will work in the adaptation of the Doppler technique in order to provide the scientific community a case study in order to pave the way to observe gaseous-type exoplanets atmosphere. Goal included in project's Activity 5.

- Explore the high frequency capabilities of VLT-ESPRESSO in order to perform seismology of Jupiter and Saturn by applying the Doppler velocimetry method to sunlight reflected at cloud level. The objective of this task is to investigate the low frequency variations induced by acoustic and gravity waves at cloud top ( $\sim 0.7$  bar). Goal included in project's Activity 5.

Expected results:

- Disentangle for the first time the vertical wind shear of Saturn's equatorial jet, retrieving that could allow to track the Semi Annual Oscillation. Goal included in project's Activity 5.

- provide the Planetary Systems community with a new high-precision tool to study planetary atmospheres, namely to detect and characterize atmospheric gravity waves. Goal included in project's Activity 5.

- to foster IA efforts in the characterization of explanatory atmospheres, provided that with the future E-ELT we are likely to be able to detect the reflected light spectrum on Neptunes type and super-earths type exoplanets [Martins2015]. Goal included in project's Activity 5.

Outreach and Science dissemination:

Contribute to raise in society the awareness of the importance of studying the atmospheres of bodies of the Solar System other than the Earth, in order to understand the past and possible future evolution of Earth's climate. Goal included in project's Activity 6.

- Public and school events: Provide talks, in the framework of the project P-TUGA, in schools and public places, including cultural venues or places dedicated to the dissemination of science. Goal included in project's Activity 6.

- Provide scientific seminars and conference talks in order to disseminate the work and results undergone in the framework of the project P-TUGA. Goal included in project's Activity 6.

The work plan is included in activity 1 (tasks 1 and 2), activity 3 (tasks 1, 2 and 3), activity 4 (tasks 1, 2 and 3), activity 5 and activity 6 of the project P-TUGA (ref 479).

#### **IV. Composition of the Jury**

In accordance to article 13 of the RJEC, the members of the jury are:

- President - José Afonso
- 1st Evaluator - Nuno Santos

- 2nd Evaluator - Gabriella Gilli
- 1st Alternate Evaluator - Fernando Buitrago
- 2nd Alternate Evaluator - Ciro Pappalardo

## **V. Place of work**

Work will be developed at the facilities of Research Center IA, in Investigação Instituto de Astrofísica e Ciências do Espaço, e será realizado nas suas instalações de Tapada da Ajuda - Edifício Leste - 2º Piso, 1349-018 Lisboa, Portugal.

## **VI. Contract Duration**

The full-time employment contract with an uncertain term is expected to start on the 1st of January 2019, and will last until the Work Plan referred to in section III is completed. It will have an expected duration of 32 months, with a maximum duration of 6 years, including an initial experimental trial period of 30 days.

## **VII. Monthly Allowance**

The gross monthly salary entitle is stipulated in clause 1 of article 5 of the Regulatory Decree No. 11-A/2017, of December 29<sup>th</sup>, corresponding to level 33 of the Consolidated Table of Allowances, as approved by Government Order No. 1553-C/2008, of December 31<sup>st</sup>, being 2,128.34 Euros, plus holiday and Christmas allowances, as well as food allowance, in value and conditions for workers with a legal relationship of employment under the Labour Code.

## **VIII. Evaluation of applications**

1. Failure to comply with the Admission Requirements implies the non-admission of candidates in absolute merit.
2. According to article 5 of the RJEC, the selection of the candidates approved in absolute merit will rely on the evaluation of their scientific and curricular achievements in the last five years, taking into consideration the quality and relevance of the scientific production, and the professional activity indicated as more relevant by the candidate, for the project P-TUGA.
3. The final classification of candidates is given on a scale of 0 to 100%.
4. Evaluation of the relative merit of candidates, will rely on the following criteria:
  - a) Participation in relevant scientific projects in the area of Planetary Atmospheres - Planetary Systems 30%;
  - b) Scientific publications in the area of Planetary Atmospheres - 40 %;
  - c) Pedagogical and outreach activities, in particular in the context of promoting scientific practices, organization of courses, seminars and conferences, in the area of Planetary Atmospheres - Planetary Systems - 10 %;
  - d) Assessment of the references provided by the candidate - 10 %;
  - e) Interview, if deemed necessary by the jury - 10%.
5. The jury may decide to interview the three best ranked [in criteria a) to d) of paragraph 4)] candidates, for clarifications and improved explanations of curricular elements.
6. The jury shall deliberate by means of a roll-call vote based on the evaluation criteria.
7. Minutes of the jury meetings are drawn up, summarizing all relevant elements considered by jury members, as well as their individual votes and justifications.
8. After completion of the evaluation process, the jury will draw up a ranking of successful candidates with their classifications.

9. Hiring will be decided by the Chairman of the Board of Directors of FCIências.ID, based on the final jury recommendation.
10. The evaluation results will be published on the website of the FCIências.ID ("Concursos" tab). The candidates will be individually notified of the evaluation results by e-mail sent to the address indicated in the "Personal Data" section of the submitted form.
11. With the notification referred to in paragraph 10, the hearing phase of interested parties referred to in Article 121 *et seq.* of the CPA will begin, and last for ten working days.
12. The possible pronouncement of the candidate in a prior hearing must be addressed to the President of the jury and submitted in writing to [fciencias.id@fciencias-id.pt](mailto:fciencias.id@fciencias-id.pt). The President of the jury will convene a jury's meeting to produce the final decision, within thirty working days.
13. Within five working days of the final jury decision, the Board of Directors Chairman of FCIências.ID will approve it and the candidates will be notified.
14. The communication between FCIências.ID and the candidates will be electronic and will comply with the following rules:
  - a) At the time of electronic submission of any document - namely in the case of paragraph no 11 - the candidates must generate proof of "sent message".
  - b) FCIências.ID will send an email message acknowledging documents received to the email address used by the candidates, within two working days.
  - c) In case of absence of a confirmation receipt by FCIências.ID – showing the possibility of technical problems that should neither be the responsibility of the candidate nor FCIências.ID - the candidates should contact FCIências.ID, with the proof referred to in point (a), to ensure delivery and proper receipt of the documents concerned.

#### **IX. Compliance with public policies**

1. FCIências.ID actively promotes a policy of non-discrimination and equal access, so that no candidate can be privileged, benefited, disadvantaged or deprived of any right or exempt from any duty due to, inter alia, ancestry, age, sex, sexual orientation, marital status, family status, economic situation, education, social origin or condition, genetic heritage, reduced working capacity, disability, chronic illness, nationality, ethnic origin or race, territory of origin, language, religion, political or ideological beliefs and trade union membership.
2. Under the terms of D.L. No. 29/2001, of February 3, a disabled candidate has a preference in equal classification, which prevails over any other legal preference. Candidates must declare their respective degree of disability, the type of disability and the means of communication / expression to be used in the selection process, under the terms of the above-mentioned diploma.

#### **X. Submission of Applications**

1. The present call will be open from 22/11/2018 to 05/12/2018.
2. The application and all the required documents may be submitted in Portuguese or English.
3. Applications will be submitted online, through the electronic platform of FCIências.ID (<http://concursos.fciencias-id.pt>).
4. On the electronic platform, applicants will complete a *mandatory* section on Personal Data [name, address, date of birth, contact email, nationality and scientific identifiers] and upload files with the documents listed below:
  - i. Detailed curriculum vitae - *mandatory*;
  - ii. A motivation letter clearly demonstrating that the candidate has an adequate profile for the position and fully complies with the Admission Requirements - *mandatory*;

- iii. Up to five publications relevant for the objectives of the Work Plan - *mandatory*;
  - iv. Digital copies of documents proving formal academic degrees (PhD) and/or other scientific and professional qualifications - original documents must be provided in case of actual recruitment- *mandatory*;
  - v. Other documents that candidates consider relevant for the assessment of their scientific merit, or to declare the personal situation in the cases covered in section IX-2 of this Notice - *optional*.
5. By decision of the Chairman of the Board of Directors of FCIências.ID, candidates who do not submit the documents identified in paragraph 4 will not be admitted to the call. In case of doubts, the Chairman may also invite candidates to substantiate specific data or statements with official supporting documents, before accepting the candidates' submission.

This Public Note was approved by the jury on 20/11/2018.