



## SUMMARY OUTLINE OF THE NOTICE OF COMPETITION

### Subject:

Public selection procedure, based on qualifications and possible interview, for the awarding of two post-doc research fellowships, lasting one year, entitled ***“Development of software tools for the analysis of heterogeneous high-energy multifrequency and multimessenger datasets and for the simulation of the gamma-ray propagation over cosmological distances and their interaction with intergalactic magnetic fields”*** for the needs of the project **“Centro Nazionale HPC: Spoke 2 - Fundamental Research and Space Economy”**,

### Description of the research activity to be carried out:

1. Analysis of data from high-energy observatories (Cherenkov Telescopes such as MAGIC and Fermi/LAT) related to gravitational waves follow-up observations and to extreme blazars.
2. Production of simulations related to the propagation of high-energy gamma-rays over cosmological distances using dedicated simulation software (e.g. CRPropa, ELMAG) on distributed computing systems
3. Testing and validation of these simulation products by developing appropriate software tools and profiling code for performance and accuracy.
4. Preliminary design of a workflow for the analysis of a heterogeneous dataset in a single pipeline and integration of the simulation products in a library (e.g. based on Gammapy) or as a cloud-based service (SaaS) for future gamma-ray facilities, such as ASTRI-mini array and CTAO.

The possible integrative interview will focus on the topics related to the sector of activity for which the selection is announced and the activities specified in art. 1 of the announcement.

### Admission requirements:

In order to be admitted to the selection procedure governed by this "Call", the possession of one of the following qualifications is required:

- PhD in Physics, Astrophysics or Engineering or equivalent, issued by a Higher Education Institute or University (including foreign);

or

-Master degree (or 2nd level Laurea degree, if issued by an Italian University) in Physics, Astrophysics or Engineering or equivalent qualification, issued by a Higher Education Institute or University (including foreign), together with at least three years of documented experience in scientific activities or technological after graduation. The equivalence will be established by the selection board according to criteria defined for the purposes of the selection procedure.

Candidates must demonstrate adequate knowledge of the following topics:

1. Gamma-ray data analysis from space missions (e.g., Fermi/LAT) or Imaging Air Cherenkov Telescope (IACT) datasets;
2. Advanced programming languages (e.g., Python, C++);
3. Software development on shared repositories (e.g., GitLab).

A good knowledge of the English language is required.

The following skills and experiences will be considered preferential requirements:

- Previous experience in the analysis of gamma-ray data from space-based and IACT datasets.
- Experience with pipeline management and the use of job schedulers (e.g. SLURM) on HPC systems.
- Knowledge of simulation packages related to gamma-ray and cosmic-ray propagation (e.g. CRPropa, ELMAG).
- Experience with electromagnetic follow-ups and interpretation on Gravitational waves related observations.
- Understanding of high-energy emission processes in astrophysical sources.

### Application for admission:

Applications must be submitted in one of the following ways:

- for Italian citizens:
  - ✓ by certified e-mail, including all required documents in PDF format, sent to [inafoaroma@pcert.postecert.it](mailto:inafoaroma@pcert.postecert.it)  
Only e-mail PEC from one of the operators indicated in the list of the AgID Digital Italy Agency pursuant to Presidential Decree No. 68 of 11/02/2005 is considered valid;
  - ✓ by regular electronic mail (e-mail) to [inafoaroma@pcert.postecert.it](mailto:inafoaroma@pcert.postecert.it) if they do not have a certified e-mail address;
  - ✓ registered mail with return receipt to the INAF-Osservatorio Astronomico di Roma, Via Frascati n. 33, 00078 - Monte Porzio Catone (RM);
  - ✓ authorized express courier to INAF-Osservatorio Astronomico di Roma, Via Frascati n. 33, 00078 - Monte Porzio Catone (RM).
- for foreign citizens:
  - ✓ by regular electronic mail (e-mail) to [inafoaroma@pcert.postecert.it](mailto:inafoaroma@pcert.postecert.it) ;
  - ✓ authorized express courier to INAF-Osservatorio Astronomico di Roma - Via Frascati 33, 00078 Monte Porzio Catone (RM).

Applications must be received no later than **19 January 2025** - 11:59 pm CET (not postmarked). Late applications will not be considered.

Requests to participate can be delivered by reporting in the subject of the e-mail the following sentence:  
**"Research grant entitled "Development of software tools for the analysis of heterogeneous high-energy multifrequency and multimessenger datasets and for the simulation of the gamma-ray propagation over cosmological distances and their interaction with intergalactic magnetic fields""**

Aware that false declarations against the law are punishable for and that the Administration can proceed to verify the veracity of the declarations made, the candidate must clearly and precisely declare:

- name and surname, date and place of birth, nationality, residence and address for sending correspondence,
- to possess all the requisites described in art. 2 of this announcement;
- not to be in some of the incompatibility conditions added to art. 4 of this announcement.

The lack of the declarations mentioned will result in exclusion from the selective procedure for incomplete application.

For the purposes of selection, the candidate can self-certify the possession of academic qualifications through Attachment 1.

In addition, non-EU citizens residing outside Italy, if successful, must produce originals or suitably certified copies of academic qualifications obtained outside Italy.

To participate, the following documents must be presented:

- Complete Application Form, as provided in the Annex 1 of this announcement;
- Annex 2 - substitutive declaration of certification - substitutive declaration of deed of notoriety (art. 19 - 46 - 47 of Presidential Decree 28 December 2000, n. 445); (ONLY FOR EU CITIZENS)
- "Curriculum vitae", signed and dated by the candidate, which also indicates any scholarships and research grants previously or in progress;
- Copy of a valid identity document;
- List of publications;
- Any other qualification, work experience, research activity at private public institutions and publications that the candidate deems appropriate to attach;
- List of all documents presented.

Candidates are admitted to the selection with reserve and may, at each stage, be notified of their exclusion from the selection for the following reasons:

- the application was submitted after the deadline;
- lack of demand;
- lack of a copy of a valid identity document;
- lack of the requisites indicated in art. 2.

If the reasons for exclusion are ascertained after the conclusion of the selection procedure, the candidate will lose all rights to participate in the selection; similarly, we will proceed if the production of false declarations is ascertained.

INAF declines all responsibility for loss of the application or documentation when this derives from the fact of the applicant for having provided incorrect contact details or for having failed or delayed notification of any changes.

### **Duration of the research fellowship**

The duration of the fellowship is one year, renewable if necessary subject to the assessment of the needs of the research program, subject to a reasoned request from the Scientific Responsible and subject to verification of financial availability and, in any case, within the limits provided for in article 22, paragraph 3, of Law 240/2010 and subsequent amendments and additions.

### **Location of the research grant**

The location of the study and research activity will be the **INAF – Osservatorio Astronomico di Roma – Monte Porzio Catone**. The candidate will be able to participate in transfers abroad.



Finanziato  
dall'Unione europea  
NextGenerationEU



Ministero  
dell'Università  
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DI RIPRESA E RESILIENZA



INAF  
Osservatorio Astronomico di Roma

### **Amount of the research grant**

The gross annual amount of the research grant is **€ 32.000,00**; this amount is to be understood net of the charges to be borne by the Astronomical Observatory of Rome and will be paid in deferred monthly installments.

**Dr Ilaria Ermolli**  
**Director**

*Estensore: Giulia Panatta*  
*Visto: la Responsabile Amministrativa*



## ATTACHMENT 1

### APPLICATION FORM

To the Director of the Astronomical Observatory of Rome

Via Frascati n. 33

00078 - Monte Porzio Catone (RM)

The undersigned ..... (married candidates must indicate their maiden name), born in ..... , prov. ...., on ....., and resident in ..... , prov. ...., in ..... , N ° ....., C.A.P. ....

applies

to be admitted to participate in the selection procedure based on qualifications and interview, for the awarding of an annual research grant entitled "*Development of software tools for the analysis of heterogeneous high-energy multifrequency and multimessenger datasets and for the simulation of the gamma-ray propagation over cosmological distances and their interaction with intergalactic magnetic fields*" for the needs of the project "**Centro Nazionale HPC: Spoke 2 - Fundamental Research and Space Economy**", announced with Directorial Determination nr. \_\_\_\_ of the\_\_\_\_\_.

To this end, under one's own responsibility and aware that the declarations made and signed in this application have the value of a substitutive declaration of certification and/or deed of notoriety pursuant to art. 46 and 47 of Presidential Decree no. 445/2000 and that in the case of falsification of documents or false declarations, the sanctions provided for by art. 76 of the aforementioned Presidential Decree,

declares

1. to be an Italian citizen or to be a citizen of the following State .....
2. to benefit from civil and political rights and to be registered in the electoral roll of the municipality of ..... or not to be registered on the electoral roll or to have been canceled from the electoral roll for the following reasons: .....
3. not to have been convicted of a crime or to have pending criminal proceedings, not to be the recipient of preventive measures and administrative measures registered in the criminal record; otherwise, the reported convictions, the measures applied and the pending criminal proceedings of which one is aware are specified ..... (1);
4. to be in possession of the following qualifications ..... , obtained from ..... on (dd / mm / yyyy /) .....

5. to be in possession of nr. .... years of documented experience in scientific, technological or management activities, gained at ..... from ..... as of ....., carrying out the following activities .....
6. the non-existence of incompatibility causes as indicated in art. 4 of the call for applications and any dependence on a public administration;
7. not to have been dispensed and or dismissed from another job employed by a public administration for persistent, insufficient performance;
8. not to have been declared forfeited from another employment employed by a public administration, pursuant to article 127, paragraph 1, letter d), of the Decree of the President of the Republic of January 10, 1957, number 3, for having obtained it by producing false documents or documents vitiated by non-remediable disability or by fraudulent means;
9. not to be the holder of other scholarships, research grants, research contracts awarded for any reason;
10. to be the beneficiary of / scholarships / research grants / research contracts awarded for any reason at the Entity / University / Institute ..... from ..... with expiry ..... and to undertake to renounce it in case of passing this selective procedure;
11. to have been the beneficiary of scholarships / research grants / research contracts (delete the type of non-interest) awarded for any reason at the Body / University / Institute ..... ..  
from the ..... to the .....;  
  
from the ..... to the .....
12. to have adequate knowledge of the English language;
13. (for Italian citizens) to be the owner of the following personal certified e-mail box ..... ..  
(and for foreigners) to be the owner of the following ordinary e-mail box ..... ..to whom to send communications regarding the procedure: and to undertake to communicate any changes to the Administration;
14. to have read and understood the rules contained in the selection announcement;
15. to be aware of the fact that, pursuant to art. 22 Italian law 240/2010, the research grant:
  - cannot be combined with participation in specialist degree courses, master's degree courses, as well as with participation in research doctorate courses with scholarship;
  - cannot be combined with other scholarships of any kind, except those awarded with the aim of integrating the training or research activity of the research fellow through a period spent abroad;
  - cannot allow the accumulation of income from work activities, even part-time, carried out continuously.

The undersigned attaches the following documentation:

1. Curriculum vitae et studiorum dated and signed;
2. Annex 2 - substitutive declaration of certification or substitutive declaration of deed of notoriety (art. 19 - 46 - 47 of Presidential Decree 28 December 2000, n. 445);
3. Double-sided copy of a valid identity document;
4. List of publications;
5. Other qualifications, documents or publications deemed useful for the purposes of the evaluation;
6. List of all documents submitted.

The undersigned expresses his/her consent so that the personal data provided can be processed, in compliance with Legislative Decree 30 June 2003 n. 196 as amended by the "Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 concerning the protection of individuals with regard to the processing of personal data, as well as the free circulation of such data and repealing Directive 95 / 46 / EC "(General Data Protection Regulation)", for the obligations related to this procedure.

(Place and date)

.....

(Signature)

.....

Not(1) Otherwise, indicate any criminal convictions, the details of the related verdicts (even in cases where no mention has been granted in the certificates issued by the criminal record at the request of private individuals or amnesty, pardon, pardon, forgiveness judicial or rehabilitation), the measures applied and any pending criminal proceedings.

## ANNEX 2 (ONLY FOR EU CITIZENS)

### FAC-SIMILE

☐ SUBSTITUTE DECLARATIONS OF CERTIFICATIONS (Art. 46 D.P.R. n. 445/2000)

☐ SUBSTITUTE DECLARATIONS OF NOTORY ACT (Art. 47 D.P.R. n. 445/2000)

(in this case, attach a photocopy of a valid identity document)

check next to the declaration of interest

The undersigned:

LAST NAME.....

(for married women indicate the maiden name)

NAME ..... TAX IDENTIFICATION NUMBER .....

BORN IN ..... (PROVINCE .....) ON .....

RESIDENT IN ..... (PROVINCE .....)

ADDRESS ..... C.A.P. .... ..

PHONE..... ,

DECLARES

under his/her own responsibility pursuant to art. 38, 46 and 47 of the Presidential Decree n. 445 of 28/12/2000, aware of the criminal penalties for false hypotheses and false declarations made pursuant to art. 76 of the same Presidential Decree:

1. to be in possession of the following qualification, required as a qualification for admission to the procedure:

\_\_\_\_\_

(In the event that the qualification has not been obtained in Italy and has not been declared equivalent in accordance with current Italian legislation), to have taken the following exams, with any related evaluation and that the legal duration of the course is years \_\_\_\_\_;

2. to be in possession of the qualifications and to have the experience / knowledge indicated in the attached curriculum;

not to be the holder of other scholarships, research grants, research contracts awarded for any reason

OR

to have been the beneficiary of study grants / research grants / research contracts awarded for any reason at the Body / University / Institute \_\_\_\_\_

1) from \_\_\_\_\_ to \_\_\_\_\_

2) from \_\_\_\_\_ to \_\_\_\_\_

The undersigned also declares to be informed that the personal data collected will be processed in compliance with Legislative Decree 30 June 2003 n. 196 as amended by the "Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 concerning the protection of individuals with regard to the processing of personal data, as well as the free circulation of such data and repealing Directive 95 / 46 / EC (General Data Protection Regulation), for the obligations related to this procedure.

I enclose an unauthenticated photocopy of a valid identity document.

Place and date .....

The declarant

.....