
SUMMARY OUTLINE OF THE NOTICE OF COMPETITION

Subject:

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Public selection procedure, based on qualifications and possible interview, for the awarding of a post-doc research fellowship, lasting one year, for the needs of the project "FIRST: to the first stars to the first galaxies", entitled: "Investigating early black holes growth at cosmic dawn with light and gravitational waves".

Description of the research activity to be carried out:

The candidate will work on developing and implementing new physically motivated prescriptions for (1) the first star forming regions at different redshifts and assuming different stellar initial mass functions, and (2) early black hole dynamics (formation and coalescence of binary/multiple black holes) across cosmic epochs. The job will include the statistical analysis and the interpretation/comparison of the model predictions against available observations and independent models/simulations presented in the literature. In addition, the candidate will work on predicting the properties of merging binary black holes (e.g. merger rate, mass, spin) in view of the next-generation space and ground based gravitational wave observatories/missions like LISA and ET.

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

- Formation and evolution of the first stars, the first galaxies and the first (supermassive) black holes at different cosmic epochs;
- future prospects of theoretical studies of black hole populations in view of the next generation facilities and missions, like JWST, LISA and ET;
- Research interests and previous scientific activity of the candidate.

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 Astronomy or Astrophysics or Physics or Computer Science or Engineering or equivalent, issued by a Higher Institute or University (including foreign);

or

- Master degree (or 2nd level Laurea degree, if issued by an Italian University) in Astronomy or Astrophysics or Physics or Computer Science or Engineering or equivalent qualification, issued by a Higher 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.

A good knowledge of the English language is required.

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The following skills and experiences will be considered preferential requirements:

- Experience with theoretical models of galaxy / quasar and black hole formation.

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. 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 if they do not have a certified e-mail address;
- ✓ registered mail with return receipt to the National Institute of Astrophysics - Astronomical Observatory of Rome - Via Frascati 33 - 00078 Monte Porzio Catone (RM);
- ✓ authorized express courier to INAF-Osservatorio Astronomico di Roma - Via Frascati 33, 00078 Monte Porzio Catone (RM).

- for foreign citizens:

- ✓ by regular electronic mail (e-mail) to 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 November 30, 2022 - 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: "Selection FIRST".

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);
- "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 research activity will start no later than February 2023. 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 Astronomical Observatory of Rome. The candidate will be able to participate in a transfer abroad.

Amount of the research grant

The gross annual amount of the research grant is **€ 28,000.00**; 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.

THE DIRECTOR OF THE “OSSERVATORIO ASTRONOMIC DI ROMA”

Dr. Lucio Angelo Antonelli