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**SUMMARY OUTLINE OF THE NOTICE OF COMPETITION**

**Subject**

Public selection procedure, based on qualifications and potential interview, for the awarding of a post-doctoral research fellowship, lasting one year -potentially renewable annually subject to a positive opinion from the scientific supervisor- for the needs of the project "Partecipazione LSST – Large Synoptic Survey Telescope", entitled: "Tools for the measurement of surface brightness fluctuations on LSST data".

**Overview:**

Among the available extragalactic indicators, the Surface Brightness Fluctuations (SBF) method is one of the most accurate and precise, allowing measurements of individual distances with a precision of  $\leq 5\%$ . Over the past two decades, the INAF-OA Abruzzo team has been highly active in extragalactic distance science using SBF. To accurately measure SBF, we have developed an original procedure to extract the SBF signal amplitude in galaxies with diverse morphology and luminosity.

**Objectives:** Within the "Participation LSST – Large Synoptic Survey Telescope" project, our team contributes in-kind (Directable SW contribution) with the aim of providing LSST's Galaxy-SC with the expertise and supervision necessary to contribute to building an accurate SBF pipeline on LSST data.

**Expected Deliverables:** The expected deliverables include:

- i) development of a series of SW packages for the analysis of optical and near-IR photometric data, aimed at measuring SBF from LSST data and its precursors;
- ii) production of documentation for the developed SW packages;
- iii) testing the SW on data from various facilities, whether from space or Earth;
- iv) publication of the SW on repositories and, potentially, the results of the analyses in a peer-reviewed journal.

Given the nature of the in-kind project, participation in coordination, update, and planning calls within the project is also required.

The possible oral interview, upon discretion of the exam commission, will focus on the topics relating to the sector of activity for which the selection is announced and the activities specified in art. 1 and art. 2 (point 3) 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 or Astronomy 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 Physics or Astronomy 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.

The following skills and experiences will be considered preferential requirements:

- Programming skills in Python (and associated packages: astropy, numpy, scipy, matplotlib, pandas, jupyter-notebook, scikit-learn, ...);
- Knowledge of scientific topics related to the analysis of the SBF signal (photometry of extended and compact objects, image analysis, properties of contaminants to the SBF signal with particular reference to globular clusters, ...);
- Experience with optical and near-IR survey data (LSST and its precursors, Euclid, ...);
- Experience with machine-learning methods;
- Familiarity with standard data reduction and analysis methods in astronomy (IRAF, SExtractor, SQL, Aladin, TopCat, R, ...).
- Experience with numerical methods for studying stellar populations in galaxies (numerical synthesis of stellar populations, SED fitting, ...).

### **Application for admission:**

Applications must be submitted in one of the following ways:

- ✓ by certified e-mail, including all required documents in PDF format, sent to [inafoateramo@pcert.postecert.it](mailto:inafoateramo@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 the address [inafoateramo@pcert.postecert.it](mailto:inafoateramo@pcert.postecert.it) if the sender does not hold a certified e-mail address;

**Applications must be received no later than January 15<sup>th</sup>, 2024 - 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 Research Grant SBF-LSST". The presumed starting period of the job is March 2024.

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 Annex 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 any of the following reasons:

- the application was submitted after the deadline;
- lack of a signature;
- 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.

In case of the potential oral interview, the admitted candidates will be notified by e-mail 15 days in advance. It is possible to waive the 15 days period if all the admitted candidates agree. Applicants are

required to indicate in the application form if he/she intends to waive the 15-advance period before the potential interview.

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 years, 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 Abruzzo under the direction of Dr. Michele Cantiello. The candidate will be able to undertake transfers within Italy and 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 Abruzzo and will be paid in deferred monthly installments.

All details of the present summary outline are available in the Italian version (DD n. 226/2023), published on the web sites of INAF and of the INAF-O.A. Abruzzo. For further clarifications, the interested applicants can send an email to the local coordinator of the project activities, Dr Michele Cantiello (michele.cantiello@inaf.it).

For what not explicitly mentioned in the detailed version of the call announcement (in Italian), the INAF-O.A. Abruzzo shall act in compliance with the regulations in force concerning Italian public selection procedures, when applicable by analogy.

**THE DIRECTOR OF THE “INAF-OSSERVATORIO ASTRONOMICOMI DI ABRUZZO”**

Dr. Enzo Brocato