

The Istituto Nazionale di Astrofisica – Osservatorio Astrofisico di Arcetri ([INAF-OAA](https://www.inaf.it)) is offering a postdoc position “*Dynamical modeling of galaxies from large HI surveys in the SKA era*” for two years with the possibility of renewal for one more year.

The successful candidate will work in collaboration with Dr. Federico Lelli (INAF staff; <https://www.lectifederico.com/>) as well as with Prof. Enrico Di Teodoro and Dr. Michele Ginolfi (University of Florence). The successful candidate will develop novel techniques to model gas dynamics in galaxies in preparation for large HI surveys from the Square Kilometre Array (SKA) observatory. One of the main goals is the development of new software to derive gas rotation curves in a fast, automated, and reliable way, using artificial intelligence and machine learning. The new software will be tested exploiting existing HI data for about 1000 galaxies as well as new HI data from ongoing surveys with SKA pathfinders (ASKAP and MeerKAT). The outputs will be used to study the systematic properties of rotation curves, construct mass models, test DM models and modified gravity theories, and investigate dynamical scaling laws (e.g., the baryonic Tully-Fisher relation and the Radial Acceleration Relation).

The following skills will be considered as preferential qualifications, but they are not strictly necessary to be awarded the postdoctoral position: programming and software development with C++ and Python, artificial intelligence and machine learning applications to Physics and Astronomy, Bayesian statistics and Monte-Carlo techniques, kinematical modeling of galaxies using 3D fitting tools (e.g., ^{3D}Barolo, KinMS, TiRiFiC), analysis of interferometric data of the HI line at 21 cm.

Arcetri Astrophysical Observatory is located on the Arcetri hill in the surroundings of Florence (where Galileo spent the last years of his life) and is part of the Italian National Institute of Astrophysics (INAF). The observatory has strong ties with the Department of Physics and Astronomy of the University of Florence and hosts a large international group working on galaxies and cosmology (see <https://sites.google.com/>).

The application deadline is January 31st at 23:59 (CET).

The application material should be sent by the candidate by email to inafoarcetri@pcert.postecert.it with the following subject "*Bando SKA DM450 (Lelli) - Domanda per Assegno DD n. 123/2023*".

REQUIREMENTS

- PhD diploma in Astronomy, Physics, Informatics or equivalent qualification (case A);
- or
- Master degree plus three years of documented research activity in Astronomy, Physics, Informatics or equivalent qualification (case B);

awarded by public or private Universities, Institutions, Research Organisations or Centres or other qualified research bodies, both in Italy and abroad, in the topics relevant to the scientific area and the research object of this call.

The application must include the following files in PDF format:

- ✓ the **Application Form (Annex A)**, dated and signed;
- ✓ the self-certification Form (**Annex B**), dated and signed;
- ✓ a copy of a valid **passport or ID**;
- ✓ the **curriculum vitae** dated and signed;
- ✓ the **list of research publications** dated and signed;
- ✓ a **research statement**, max. 2 pages, dated and signed;

- ✓ a copy of the **degree certificate**. In case of degrees awarded by a non-Italian institution, please include a copy of the certificate of your highest degree (PhD in case A, or Master degree in case B), and associated transcriptions of exams done (in case B);
- ✓ in case the candidate has not the PhD, she/he is invited to clearly describe the **three years of research activity** as indicated in the requirements;
- ✓ any other document, work, or publication the candidate considers useful to qualify her or his scientific curriculum;
- ✓ a **list** of all the submitted documents.

REFERENCE LETTERS

Two reference letters in PDF format must be sent by the referees (selected by the candidate) before the deadline to inafoarcetri@pcert.postecert.it

The subject field needs to include the string “**DD n.123/2023**” and the full name of the applicant.

For any information (scientific and/or administrative) please send an email to federico.levi@inaf.it