



THE HEAD

SUBJECT: Comparative evaluation procedure based on qualifications and interview for the award of n. 1 research contract pursuant to Article 22 of Law 240/2010, as amended by Law 79/2022, for the Department of Physics and Astronomy “Augusto Righi” - SSD PHYS-02/A - GSD 02/PHYS-02

Having regard to the resolution of the Council of the Department of Physics and Astronomy “Augusto Righi”, dated 03 July 2026, requesting the activation of 1 research contract financed by the funds of the project ERC starting grant QUANTHEM, GA: 101114881, CUP: J33C23003910006;

Considered that on 21 July 2026 the Board of Governors approved the request for the activation of the research contract;

Considered that that the above-mentioned research needs represented by the Department of Physics and Astronomy “Augusto Righi” can be satisfied by announcing a public selection procedure;

Having regard to the provisions referred to in Article 13 of this notice;

ORDERS

Art. 1 – Purpose

A procedure of comparative evaluation by qualifications and interview is called for the award of n. 1 research contract pursuant to Article 22 of Law 240/2010, as amended by Law 79/2022, in the framework of the project “Quantum circuit models for many-body physics”, SSD PHYS-02/A – Theoretical Physics of Fundamental Interactions, Models, Mathematical Methods and Applications, GSD 02/PHYS-02 – THEORETICAL PHYSICS OF FUNDAMENTAL INTERACTIONS, MODELS, MATHEMATICAL METHODS AND APPLICATIONS.

The contract is activated on the basis of the request made by the Department of Physics and Astronomy “Augusto Righi” of Alma Mater Studiorum - Università di Bologna. The contractor's main place of employment will be Bologna.

The contract will last two years. The gross annual salary of the employee, including the thirteenth month's salary, is equal to € 34.995,00.

Art. 2 – Activities to be performed

Only research activities related to the specific research project, the implementation of which is linked to the signing of a contract, are envisaged. This activity will be carried out under the supervision of a scientific supervisor identified by the Department of Physics and Astronomy “Augusto Righi” in Professor Lorenzo Piroli.

The time to be dedicated to research project activities is 1.720 hours per year. Contractors will coordinate their work in consultation with their Scientific Supervisor regarding the organisational

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APOS - PERSONNEL DIVISION | UNIT RECRUITMENT OF PROFESSORS, RESEARCHERS AND PRE-TENURE STAFF

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aspects of the project. The performance of the research activity must be self-certified on a monthly basis and validated by the Scientific Supervisor.

The activities that each awardee will have to develop are linked to the project: “Quantum circuit models for many-body physics”.

Description of the main research activities entrusted: This research is part of the QUANTHEM project, which aims to explore the potential of quantum computers in the field of many-body physics. The research activity is organized into three main lines. The first line of research focuses on the study of circuit models of many-body systems, including quantum cellular automata, and the development of techniques for their analysis. The second line focuses on the investigation of many-body phenomena in these systems, including new phase transitions. The third line explores the possibility of using protocols that employ quantum circuits to prepare states of interest for the quantum simulation of many-body physics. The research will therefore involve theoretical study, model development and analysis, as well as computational work, either analytical or numerical.

Objectives of scientific productivity: Publications, participation in conferences (including poster presentations and seminars), and scientific visits to international institutions to disseminate the results obtained.

Art. 3 – Admission requirements

Candidates, including citizens of countries outside the European Union, holding a doctorate or an equivalent qualification obtained in Italy or abroad on the closing date for applications are eligible for selection.

Candidates enrolled in the final year of a doctoral course may also be admitted to the selection, provided that the degree is expected to be obtained by the deadline of six months following the date of publication of this selection notice.

In the case of a PhD obtained abroad, it is necessary to alternatively:

1. Attach the decree of academic recognition of the degree (issued pursuant to art. 74 of Presidential Decree no. 382/1980, ex equivalency, or art. 38 of Legislative Decree 165/2001), for those who already possess it by the deadline of the call;
2. Request the University of Bologna, at the application stage, the procedure for the recognition of the foreign degree pursuant to Article 38, paragraph 3.2 of Legislative Decree no. 165/2001. In this case, the candidate undertakes to send the necessary documentation to the following e-mail address apos.selezionepreruolo-collaboratori@unibo.it or certified mail address (scriviunibo@pec.unibo.it) should he/she be successful. The recognition procedure has a maximum duration of 45 days from the delivery of all the necessary documentation to the office;
3. As a last resort, attach a copy of the receipt for the start of the equivalence procedure, as provided for in art. 38 of Legislative Decree 165/2001. The form for requesting equivalence of foreign qualifications can be found at: <https://www.funzionepubblica.gov.it/it/il-dipartimento/documentazione/moduli-equivalenza-titoli-di-studio/>. Pursuant to the provisions of



paragraph 3 of art. 38 of Legislative Decree 165/2001, as amended by Law 69/2025, the Department of Public Service concludes the recognition procedure only for the winners, who have the obligation, under penalty of forfeiture, to submit a request for recognition within fifteen days of the publication of the final ranking, to the Ministry of University and Research. It is specified that the deadline for concluding the procedure for issuing the provision for recognition of the foreign qualification by the Department of Public Service, upon opinion of the Ministry, is 150 days from the request and is suspended in the event that it is necessary to integrate the documentation. In any case, the provision must be submitted to the Administration before taking up service.

Please note that simple Declarations of Value cannot be attached.

Pending the decision referred to in point 2 or 3, you may take part in the selection on a conditional basis.

For further information on the procedures for the recognition of foreign qualifications, please consult the University's web page regarding the 'Recognition of foreign qualifications'.

This selection procedure is not open to:

- tenured staff of universities, public research organisations and institutions whose postgraduate scientific diploma has been recognised as equivalent to a doctorate, in accordance with Article 74(4) of Presidential Decree No 382 of 11 July 1980;
- those who have held fixed-term assistant professorship contracts pursuant to Article 24 of Law 240 of 2010 (RTT, Rtd a and Rtd b);
- those who are related, by kinship or affinity up to and including the fourth degree, to a professor of the Departments or the Structure proposing the activation of the contract, or to the Rector, the Director General or a member of the Board of Governors of the University.

Art. 4 – Application procedure

The application to take part in the selection must be submitted exclusively online via the Pica portal: <https://pica.cineca.it/unibo/>

Call deadline: 08 October 2026 - 12:00 CET.

The application must be submitted together with all the necessary supporting documents.

The following documents must be attached to the online application, preferably in PDF format (other supported formats JPG, BMP, PNG):

1. scan of a valid identity document (max. 10MB);
2. *curriculum vitae* describing the candidate's scientific and professional activities (max. 10MB);
3. any other supporting documents that the candidate considers useful for the evaluation (e.g. list of publications, Master's degrees, postgraduate specialisation courses, scholarships and research contracts, awards and recognitions for research activities, letters of reference, etc.);
4. the project proposal for carrying out of the research programme for which the position for which you are applying has been activated (max. 30 MB).



The following information is provided to help you submit your project proposal: The project aims to study quantum circuit models of many-body systems, both in the context of non-equilibrium physics and in the context of preparing equilibrium states. The models of interest include various types of circuits, such as quantum cellular automata, so-called dual-unitary circuits, Clifford circuits, and integrable circuits. The project's objectives can be pursued both through analytical techniques, such as those based on integrability, and through numerical methods, such as those based on tensor networks. One research direction involves identifying observable many-body phenomena in these systems, including new phase transitions, such as those induced by repeated projective measurements. In this context, we aim to study ergodic properties and quantum information scrambling in these phase transitions. Another area of research concerns the possibility of using protocols that employ quantum circuits to prepare states of interest for the quantum simulation of many-body physics. In this context, the goal is to develop algorithms based on the structure of the wave function of states of interest and their entanglement. Finally, the project will contribute to the development of techniques for analyzing many-body systems that are applicable more generally, especially in non-equilibrium conditions. In particular, methods will be developed for the exact calculation of quantum resources such as entanglement and non-stabilizerness. In the project proposal, the candidate must describe their research experience and the main results achieved, relating them, where possible, to the project's themes. They must also indicate their familiarity with analytical or numerical techniques useful for carrying out the project. Finally, the candidate must propose a research direction, based on their experience, that can be related to the project's themes. The project proposal must be written in English and must not exceed 4,000 characters in length.

Failure to attach the project proposal and/or curriculum vitae will result in the elimination of the candidate from the pre-selection procedure, as he/she will not be able to obtain the minimum score required to proceed to the interview.

Candidates are responsible for ensuring that their application contains the following information:

1. name and surname;
2. place and date of birth;
3. nationality;
4. home address;
5. (for Italian citizens) whether they are registered to vote or, if not, the reasons why they are not registered or have been removed from the electoral rolls;
6. a declaration that they have not been convicted of a criminal offence and have no pending criminal proceedings; otherwise, candidates must specify the convictions (date and the judicial authority that issued it) and any pending criminal proceedings. The existence of a previous criminal conviction does not in itself constitute an obstacle to employment, unless it is a conviction for an offence which prevents the establishment of an employment relationship with



the public administration as it results in disqualification from holding public office, the inability to conclude a contract with the public administration or the termination of the employment relationship (articles 28, 29, 32-ter, 32-quater, 32-quinquies of the Criminal Code, articles 3, 4, 5, Law no. 97 of 27 March 2001). In other cases, the administration will independently assess the seriousness of the offences committed by the person concerned for the purposes of access to public employment. The purpose of this assessment is to determine whether the element of trust, which constitutes the fundamental condition of the relationship between employer and employee, exists and to assess whether the requirements of moral suitability and aptitude to perform the activities of a public employee are met;

7. possession of the qualification required in art. 3 of this announcement with the relevant information or enrolment in the final year of the course of study and the expected date for obtaining the qualification;
8. to be physically fit for continuous and unconditional service for the employment to which the selection procedure relates;
9. not permanently employed by the institutions referred to in Article 22(1) of Law 240/2010 (universities, public research organisations and institutions whose postgraduate scientific diploma has been recognised as equivalent to a doctorate in accordance with Article 74(4) of Presidential Decree 382 of 11 July 1980);
10. that he/she has not held fixed-term assistant professorship contracts pursuant to Article 24 of Law 240 of 2010 (RTT, Rtd a and Rtd b);
11. not be related, by kinship or affinity up to and including the fourth degree, to a professor of the Department or Structure requesting the activation of the contract, or to the Rector, the Director General or a member of the Board of Governors of the University;
12. to be/not to have been the holder of previous research contracts pursuant to art. 22 of Law 240/2010, as amended by Law 79/2022 and, if so, the months already enjoyed at the date of submission of the application;
13. the e-mail address chosen for the purpose of communications;
14. Foreign nationals must also declare that they have a sufficient knowledge of Italian and that they also enjoy civil and political rights in the country of their nationality or origin, or state the reasons why they do not.

The system allows you to save your application in draft mode. The application must be completed and submitted by the deadline, after which the computer system will prevent access to the application and its submission. Applications in "draft" status will not be taken into consideration after the deadline for submitting applications.

The candidate will receive an e-mail confirming the successful submission, which will also contain an identification number that will identify the candidate from that moment on and must be quoted in any further communication. The identification number must also be retained for the purposes of



communications from the University, where the name of the recipient of the communication must be omitted for reasons of privacy.

Any changes must be reported immediately to apos.selezionepreruolo-collaboratori@unibo.it. In the event of technical problems, please contact the Cineca support service, the link to which can be found at the bottom of the Calls for Application webpage <https://pica.cineca.it/unibo/>.

Art. 5 – Applicants’ obligations under penalty of exclusion

Candidates will be automatically excluded from the selection procedure in the following cases:

- Failure to comply with the prescribed application submission procedures and deadlines;
- Failure to satisfy the requirement set out in Article 3 of this call for applications.

All applicants will be admitted to the selection procedure. The Administration reserves the right to verify that they meet the conditions for participation. The Administration may decide to exclude a candidate from the selection procedure at any time, even after the interview.

Art. 6 – Selection Board

The Selection Board will be appointed by a resolution of the administration and is composed of three members chosen from among professors or researchers, excluding junior fixed-term researchers, or members with an equivalent role if they come from foreign universities or research institutions, chosen by the Department that proposed the activation of the contract and, as a rule, are classified in the subject area or, subordinately, in the subject group in which the procedure has been advertised.

In order to guarantee equal opportunities for men and women in terms of access to employment and treatment at work, as provided for by art. 57 of Legislative Decree no. 165/2001, the members are normally represented by each gender.

The Selection Board appoints a president and a recording secretary among its members.

Notice of the appointment will be published on the of the Alma Mater Studiorum - Università di Bologna website.

Art. 7 – Selection procedure

The candidates are evaluated by means of a comparative procedure based on qualifications and an interview, with the aim of verifying that the project proposals correspond to the research projects to be selected and that the candidates have a scientific-professional curriculum suitable for carrying out the research activity that is the subject of the contract.

The final score is the sum of the scores obtained in the evaluation of the project proposal and the scientific-professional curriculum and the score obtained in the interview. A maximum of 100 points will be awarded, of which a maximum of 70 points will be awarded for the preliminary evaluation and a maximum of 30 points for the evaluation of the interview.

The Board will carry out the preliminary comparative evaluation on the basis of the following criteria:

(a) the project proposal submitted by the applicants:



a.1) originality, methodological rigour, clarity and completeness of the project proposal, up to a maximum of 20 points;

a.2) consistency of the project proposal with the research project to be selected, up to a maximum of 20 points;

(b) the scientific-professional curriculum vitae of the applicants:

b.1) relevance of the qualifications to the subject of the research project to be selected, up to a maximum of 5 points;

b.2) consistency of the scientific production and its congruence with the project that is the subject of the call, up to a maximum of 10 points;

b.3) relevance of previous research activities in relation to the research project to be selected, with particular reference to what has been carried out in the three years preceding the publication of the call, (e.g.: scholarships and research contracts, awards and recognitions for research activities, any letters of reference provided by the applicants, etc.), up to a maximum of 15 points.

The Board will give a reasoned opinion and assign a relative score for each individual evaluation criterion. At the end of the pre-selection phase, candidates with a score of 50/70 or more will be invited for an interview.

The interview with the Board will be open to the public and will be conducted electronically using the audio and video teleconferencing tool via the Teams platform (the workstation from which the candidates will participate in the interview must be equipped with a webcam - essential for recognising the candidate, a microphone and headphones and/or speakers).

Notice of the day and time is published with at least 15 days' notice on the University website at the page: <https://bandi.unibo.it/ricerca/contratti-ricerca>.

The information published will constitute official notification to all applicants, without any obligation for further communication.

Notice of the publication and of the admission to the interview will be given to the email address indicated by the candidates in the application.

Failure to connect electronically to the interview, on the date and at the established time, or late connection, even if due to force majeure, will be considered as a waiver of participation in the selection.

The Alma Mater Studiorum - Università di Bologna accepts no liability with regard to the email not being received or read. However, it is the candidate's responsibility to keep themselves informed by checking the website of the call for applications for information on the selection.

Candidates attending the interview must bring a valid identification document with them.

EU citizens should bring their passport or an identity document issued by their country of origin.

Non-EU citizens should bring their passport.

The aim of the interview is to assess the feasibility of the project proposal, the scientific maturity and the preparation of the candidates, with particular reference to the project to be selected.

The discussion takes place in English, of which adequate knowledge is also ascertained.



A score of 21/30 or higher is required to pass the interview. For those who pass both tests, the final score will be the sum of the scores obtained in the assessment of qualifications and in the interview.

Art. 8 – Formulation of the ranking list

At the end of the interviews, the Board will draw up a merit ranking list for each call, taking into account the overall marks awarded to the candidates.

In the event of equal merit, preference will be given to the younger candidate.

The merit ranking list is approved pursuant to an administration resolution and is published on the official Alma Mater Studiorum - Università di Bologna online Bulletin. The ranking list is valid for 6 months.

The time limit for appeals starts from the date of publication of this notice, in case the resolution has not been otherwise disclosed.

If the winner of the procedure is a candidate who does not yet have the qualification required for access to the selection, the research contract can be stipulated only after the acquisition of the same qualification, which must occur within six months of the date of publication of this announcement, under penalty of forfeiture.

The candidates who are found suitable at the end of the procedure and do not yet have the required qualification, must acquire this qualification within the same terms, under penalty of forfeiture of the position occupied in the ranking.

Art. 9 – Employment procedure

The winner will be invited to sign an individual contract with a view to entering into a fixed-term employment relationship within the term given by the Administration.

The employment relationship will be governed by the individual contract, by the Regulation on Research Contracts provided for in Article 22 of Law 240/2010, as amended by Law 79/2022, by statutory laws and by EU regulations.

The individual contract specifies the grounds for termination of the contract and the notice periods. In any event, the contract shall be terminated immediately and without notice in the event of the cancellation of the recruitment process to which it is inextricably linked.

The duration of the probationary period is one day of actual work for every fifteen calendar days starting from the date the employment relationship begins. At the end of this period, unless the employment relationship has been terminated by one of the parties, the employee's service will be confirmed and the entire period worked from the start of the contract will be counted for seniority purposes.

Employees of public administrations other than those referred to in Article 22(1) of Law 240/2010 shall be placed on leave for the entire duration of the contract, without salary or social security contributions, or in a position outside their role, if such a position is provided for by the relevant regulations, also without salary or social security contributions.



Art. 10 – Documentation required for the participation in the public selection and for hiring purposes

For the purpose of participating in the public selection procedure, documents and qualifications in English, French, German, and Spanish may be submitted in their original language.

Documents and qualifications in other languages must be submitted in the original language, accompanied by an Italian or English translation. The translation must be certified as faithful to the foreign text and may be made by the competent diplomatic or consular representation or by an official translator. In the case of documents required for employment purposes, all deeds and documents written in a foreign language must be accompanied by a certified translation into Italian, which can be made by the competent diplomatic or consular representation or by an official translator.

Art. 11 – Rights and duties of fixed term researcher

Without prejudice to the rights and obligations provided for in the Italian Civil Code with regard to employment relationships, the researcher, by signing this contract, undertakes to carry out the activities described in article 2.

The researcher shall carry out the agreed activities in accordance with the existing hierarchy in the relevant structure and in coordination with the research project.

The researcher will perform the activities in person and may not appoint substitutes.

The researcher shall be covered existing Italian laws concerning maternity, injury and illness.

The researcher undertakes to comply with the provisions of Regulation for research contract, the Regulation on Industrial and Intellectual Property, the Regulation on the Code of Conduct for the Prevention and Combating of Discrimination, Moral and Sexual Harassment and the Discipline of the Confidential Adviser(s) and the University's Code of Ethics and Conduct.

The researcher also agrees to fulfill all training requirements related to occupational health and safety, ensuring that they complete the relevant training courses before commencing any work activities, as well as those related to personal data protection, upon starting work and, in any case, no later than 60 days thereafter.

Art. 12 – Processing of personal data and Procedure Supervisor

Information on the processing of personal data provided for the purposes of participation in the selection procedure is available at www.unibo.it/privacy (Privacy policy for participants in competitions and selections announced by the University).

The Administrative Procedure Supervisor (RPA) is Michele Menna.

For any further information on the competition procedure, please contact APOS - PERSONNEL DIVISION - UNIT RECRUITMENT OF PROFESSORS, RESEARCHERS AND PRE-TENURE STAFF - OFFICE FOR THE SELECTION OF RESEARCH CONTRACTS, POSTDOC POSITIONS AND COLLABORATORS - Piazza Verdi, 3 – 40126 Bologna - tel. + 39 051 2098973 – 2098165 – 2098978 – 2099264 – 2098974; e-mail: apos.selezionepreruolo-collaboratori@unibo.it



Art. 13 – Regulatory framework

The regulations under which this call for applications is issued are as follows:

- Article 22 of Law No. 240/2010, as amended by Law No. 79 of 29 June 2022, converting, with amendments, Decree Law no. 36 of 30 April 2022;
- Legislative Decree No. 165 of March 30, 2001;
- Presidential Decree No. 445 of December 28, 2000;
- Presidential Decree No. 487 of May 9, 1994;
- Law No 241 of August 7, 1990;
- Regulation on Research Contracts pursuant to Article 22 of Law 240/2010 as amended by Law 79/2022¹, approved by Rector's Decree no. 493/2025 ref. no. 99679 of March 29, 2025 and s.m.i.

Personnel Division Manager
(Dott. Michele Menna)
digitally signed

¹ [Link to the website for documentation on the University regulations](#)