



## CALL FOR QUANTUM COMPUTING PROJECTS

INFN has joined the Quantum Science and Technology in Trento (Q@TN) initiative. At the same time, INFN and CINECA have in place a framework partnership agreement and the University of Trento is member of the CINECA consortium. One of the pillars of Q@TN is the promotion of research projects of high scientific quality in the field of the quantum science and technologies (QST). To this end, Q@TN is looking for proposals seeking access to the Quantum Computing (QC) facility made available by CINECA. In particular, the QC system will be D-Wave (Quantum annealer) for a total of 10 QPU hours for a configuration of up to 50 Qbit. Some access time to QC emulators running on the digital supercomputer system Marconi 100, will be available as well.

In order to promote the involvement of the national INFN community in Q@TN, applications must be presented by a team including at least one member of Q@TN based in Trentino (i.e. belonging to UNITN, FBK or INFN-TIFPA), and at least one member who is an INFN associate not based in Trentino. More scientists from other institutions can participate as well. Information about the research lines active within Q@TN and the corresponding contacts are available on the Q@TN website ([quantumtrento.eu](http://quantumtrento.eu)). Any area of application of Quantum Computing to QST will be considered. Proposals should include a clear statement of the needed resources, and whether they are meant for exploratory work or for production. Each project cannot exceed one quarter of the total computing resources available. The deadline for submission is May 24th, 2021 at 12 am. Projects should be submitted by using the joined format in a pdf file to the [info.qtn@unitn.it](mailto:info.qtn@unitn.it).

A selection committee will be nominated by the Q@TN management board among the members of Q@TN. Projects will be evaluated by at least two external reviewers nominated by the selection committee. The committee can also seek advice from external experts to assess the technical feasibility of the project. Based on the reviewer reports, the selection committee will rank the projects according to the criteria listed below. Those top projects, which are within the computing time budget limit, will be granted access to the resources through CINECA. The selection process will be completed by the end of June 2021 so that teams can start their computing activity by the middle of July 2021. The computing part of the projects should be ended within Dec. 31st 2021. The reference person of the granted projects will have to present by June 30th, 2022 a written report about the results of the project. If a preprint or a publication directly related to the results obtained from computations are available, they can be presented instead of the report. In any case, the reference person should provide answers to a questionnaire related to the quality assessment on the use of the computer resources and the proposed scheme, this will be sent six months after the beginning of the projects.

The main evaluation criteria will be:

- *General research track of the proponents and potential to perform the proposed research.* While a proven expertise in quantum computing is welcome, one of the purposes of Q@TN is to support individuals that plan to open new research lines in the direction of quantum science and technology. In that case, the scientific credibility of the applicant's intention to move into the new field will be a criterion of evaluation.
- *Excellence of the project in terms of scientific merit and/or perspective according to international standards.* Q@TN seeks to fund projects that go beyond the state of the art and have the potential of opening new perspectives in research, so to enable further collaborative projects. The feasibility of the proposed research, given the limited available resources, will be also considered.
- *Potential of the project towards the establishment of successful and sustainable new research activities and collaboration between researchers of Trentino and of the national INFN community within Q@TN.* Therefore, the actual strength of the synergy will be a criterion for evaluation.





*Q@TN - Quantum Science and Technology in Trento*  
**APPLICATION FORM**  
*for PhD or postdoctoral fellowship*

1. Project title: \_\_\_\_\_

2. Keywords: \_\_\_\_\_

3. Amount of computing resources requested: \_\_\_\_\_

4. The project concerns mostly:

Exploratory work

Production

Other: \_\_\_\_\_

5. Proponents (at least two researchers, one Q@Tn member based in Trentino, and one from INFN not in Trentino):  
For each proponent, please provide name, surname, qualification, affiliation, a list of recent funded projects, a list of 5 recent publications related to the project (1), a short CV, and an e-mail address. A reference person should be indicated, serving as point of contact for the evaluation committee, CINECA, and possibly the technical support teams of the companies providing the computing facilities.

6. Description of the project

Activities, objectives, deliverables, justification of the resource amount requested, need of technical support, possible other available resources to sustain the activity, etc. (max two pages in Times New Roman 11, excluding references)

7. Relevance of the project in the current status of QC:

Significance of the project objectives for the advances of quantum computing and/or development of algorithms in a broad sense, at the national and international level. Perspectives for a future development of the activity and of the collaboration within the team (max one page).

8. Possible referees:

Notes

(1) If these are not yet available, list any evidence in support of an active research interest in quantum science and technology.

