

Swiss Quantum Initiative – Strategy for 2025-2028

Explanations to the “Recommendations for the allocation of public funding”

Addendum I – Goals

January 8, 2024

The purpose of this document is to provide explanations to the “Recommendations for the allocation of public funding” by the Swiss Quantum Commission (SQC) from November 29, 2023. Specifically, this document outlines considerations on the goals for the Swiss Quantum Initiative (SQI) in 2025-2028.

1. Overarching goal

The overarching goal of this national initiative has been formulated in accordance with the decision of the Federal Council of May 4, 2022 on supplementary measures in the area of quantum research and innovation. The SQC assumes that this goal for 2023-2024, as stated within the Additional Protocol of September 12, 2023, shall remain the basis for the period 2025-2028.

The overarching goal of the SQI is, on purpose, ambitious and integrative in nature and goes significantly beyond typical, individual targets for research and innovation funding:

This initiative shall strengthen Switzerland's leading position in the field of quantum science and technology across the entire value chain (from fundamentals to application), to remain competitive and connectable at the international level, and to maintain a good position for international collaborations.

2. Identified fundamental needs and goals

In order to reach this overarching goal, the following fundamental needs and subsequent goals of the Swiss Quantum community have been identified by the SQC during the year 2023 in intense dialogue with the research and innovation communities.

- (i) **Strengthening quantum research with the goal to enable breakthroughs in scientific discoveries.** Scientific research remains crucial given the current, still early-stage of development of the field and concerns both cutting-edge fundamental research and more application and technology-oriented research.
- (ii) **Fostering quantum innovation with the goal to develop a fertile environment for ideas and projects to grow and mature into solutions of industrial size.** The SQI shall develop innovation in dialogue with leading industry representatives and private investors. This dialogue shall identify gaps and possible synergies and hence contribute to an effective and harmonious development of the Swiss quantum ecosystem at large.
- (iii) **Building a bridge from quantum research to real-world applications with the goal to offer benefits for society and impact on the economy.** It will not be sufficient to

support research and innovation separately. There is a strong need to close the structural gap between research and innovation.

- (iv) **Strengthening quantum education and workforce with the goal to accommodate the expected growth in quantum applications.** It is anticipated that in particular quantum engineering skills will have to be strongly developed. More generally, quantum literacy shall be improved at all educational levels.

3. Fields of action and specific goals of the measures

For each of the four identified needs, the SQC defines a field of action with measures to be taken in 2025-2028 by the SQI to reach the specific goals.

- (i) **Field of action 1: Promoting scientific research**

Switzerland is currently well-positioned as a leading country in quantum research. The goal of the SQI is to keep this position in an international environment where investments are rapidly increasing in many other countries. The specific goal of promoting scientific research is to foster a Swiss Quantum community that is able to continuously compete successfully with other leading quantum communities in the world. The SQI shall therefore provide impactful subsidiary funding for basic and applied quantum research to complement the scientific project funding by the SNSF and the research funds allocated by the cantonal universities and the ETH-Domain. This will be implemented mainly via calls for research projects with self-chosen objectives within a given quantum topic area. Scientific excellence shall be the leading evaluation criterion.
- (ii) **Field of action 2: Fostering innovation**

Switzerland is a country of innovation and this is also true for quantum innovation. Alike for scientific research, the goal is to compete successfully in a rapidly evolving international environment. The specific goals are to provide tangible impulses for Swiss startups and industries in the Swiss quantum landscape and enabling breakthroughs in the underlying scientific approaches (“quantum innovation for science”). This could possibly also contribute to national security and the protection of national critical infrastructures. The concrete measure would be calls for innovation projects and start-up support to complement the funding provided by Innosuisse.
- (iii) **Field of action 3: Developing infrastructures and platforms**

The SQC identified the development of infrastructures and platforms as the best way to close the current structural gap between research and innovation. It also came to the conclusion that the earlier innovation phases shall be the prime targets for public support in 2025-2028. The specific goal is thus to provide effective infrastructures and platforms to be available to various research groups all over Switzerland to develop and test components with the potential of applications. These shared infrastructures shall thus enable scientific breakthroughs with the potential for innovation and industrial production. The envisioned concrete measures to develop such infrastructures and platforms are calls for projects for significant upgrades or new shared infrastructures, as well as voucher models to optimize the access, use and utilization of existing facilities, assets and services. The main criterion shall be the pertinence of the infrastructure in the Swiss and international landscape. The aim is to build on and be in the lead in areas where Switzerland is particularly strong and also to fill possible gaps to be identified in a close dialogue with leading industry representatives and private investors.
- (iv) **Field of action 4: Giving impulses for education and workforce**

In addition and closely linked to the above fields of action, the SQC identified that the anticipated rapid growth of quantum applications requires additional impulses for

education and workforce. A specific goal is to increase quantum literacy by outreach activities and the promotion of foundational knowledge in the field of quantum science and technology. Another is to further develop specific skills with relevance for quantum research and innovation. And a third is to support education and workforce efforts, which are complementary with established education and training programs. The envisioned activities would include both conceptual and practical activities. In view of the increasing importance of engineering skills and emerging applications, the SQC suggests to place particular emphasis on universities of applied sciences, besides other public educational institutions such as universities and grammar schools.