

Federal Ministry of Education and Research

Announcement

of regulations governing the funding of projects to establish “Quantum Future” academic junior research groups
English excerpt translation

of DD MMM 2023

1 Funding aim, purpose and legal basis

The Federal Ministry of Education and Research (BMBF) intends to fund projects on second-generation quantum technologies within academic junior research groups on the basis of its quantum systems research programme entitled “Quantensysteme. Spitzentechnologie entwickeln. Zukunft gestalten.”, see www.quantentechnologien.de). In this way, the BMBF makes a tangible contribution to improving the general conditions for early-career researchers in particular and to enhancing Germany’s attractiveness as a base for research.

Second-generation quantum technologies are focused on applications of the controlled quantum states of single or coupled quantum systems. Targeted preparation, coherent control as well as precise readout enable novel potential for use cases in maximum-precision and sensitive measurement and imaging processes, in information transmission/processing, as well as for the simulation of complex systems beyond the bounds of current limitations.

Enabling innovation to emerge from the potential of quantum systems for industry and society requires the further development of the necessary expertise to implement ideas and research results. Well-trained junior researchers are a basic prerequisite to lastingly secure necessary research competence and innovative capacity, especially in a field as research and knowledge-intensive as quantum technologies. Moreover, a targeted thematic focus on strategic research issues can raise Germany’s research profile in the international competition.

1.1 Aim of funding

The aim of the Quantum Future junior researchers competition is to build sustainable research structures. This is to enable excellent junior researchers to advance the transfer of basic research findings to new technological and commercial use cases. The measure provides young research talent with optimal starting and overall conditions for successful scientific work. The aim is to attract a pool of international, highly qualified people to Germany’s research and industrial sectors and thus contribute to securing Germany’s competitiveness in the long term. In particular, the funding targets international researchers with experience gained during extensive, successful periods of study or research abroad.

1.2 Funding purpose

In the context of the “Quantum Future” competition for junior researchers, funding will be provided to excellent early-career researchers to put together their own, independent junior research group which adopts new, interdisciplinary approaches in research on second-generation quantum technologies. As a result of their research, their management of a junior research group, supervision and guidance of scientific staff as well as possibly establishing a start-up company,

these early-career researchers will acquire the skills necessary for management tasks in business and research.

Ten junior research groups each have been funded and established in the context of the first two “Quantum Future” competitions (2017 and 2021). The majority of these groups have been permanently established in professorships.

The results from the funded project may only be used in the Federal Republic of Germany or the European Economic Area (EEA) and in Switzerland.

2 Object of funding

Funding will be provided to individual projects at higher education institutions (universities/universities of applied sciences) and non-university research institutions which address relevant issues in quantum technologies. The aim of the projects is for early-career researchers to form academic junior research groups. Funding will support the formation of research focus areas within existing cooperation networks and promote a synergistic enhancement of research branches within the institution and network. The junior research group to be established will complement the research profile of the applicant institution in the priority field “quantum technologies” or contribute its excellent work to existing priorities.

The objective is to create lasting structures once the project has concluded. Submitters of project proposals are expected to pursue a realistic and convincing concept addressing this objective. This concept must be explained in detail by the applicant institution in particular.

Project themes can address any and all areas of second-generation quantum technologies and related specialist fields. More specifically, this includes quantum computing, quantum simulation, quantum information science, quantum sensing and metrology, quantum communication and supporting technologies. Both experimental and theoretical work – also in the area of information theory – will be considered, provided it has concrete relevance to quantum technology use cases and does not constitute mere basic research. Interdisciplinary contributions are expressly welcome. Projects which focus exclusively on quantum communication are also eligible for funding through the Federal Government’s research framework programme for IT security known as “Digital.Sicher.Souverän.” [Digital.Secure.Sovereign.]¹ Projects are expected to yield long-term use of results for scientific, technological and commercial purposes. Beside publication and patenting of project results, this use includes suitable measures to promote technology transfer, e.g. strategies for start-ups. An illustration of use-case orientation or downstream commercial usability of research outcome is an explicit requirement for funding. Establishing alliances early on with business enterprises with a branch in Germany is desired. The involvement of companies in the funding projects by means of financial and in-kind contributions, provision of lab capacity, staff exchanges etc. will be assessed favourably in the selection of suitable proposals, taking into account the maturity of the addressed research topic.

Funding will not be provided for research and development projects that lack any demonstrable innovative approach, are pure feasibility studies or reviews of the literature, and approaches which do not envisage progress beyond the current state of technological development.

Funding can also be provided within a single project for expenditure/costs incurred for the organization and hosting of networking meetings of all Quantum Future projects which enable exchange between the funded junior research groups.

¹

See the following website for contact information (last accessed on 11 August 2023):
<https://www.forschung-it-sicherheit-kommunikationssysteme.de/>

3 Funding recipients

Proposals may be submitted by institutions of higher education (universities/universities of applied sciences) and non-university research institutions which are headquartered in Germany. Funding is provided as an individual grant linked to the leadership of the junior research group. The target group are excellent young researchers who have gained initial research experience after completion of their doctoral studies. The profiles of these early-career researchers include possession of a higher education degree, some experience in independent research, experience abroad, some team leadership experience and cooperation skills, flexibility and willingness to move, or experience with interdisciplinary collaborations. The BMBF aims to increase the share of researchers returning from abroad to Germany. Junior researchers who have been doing research abroad for quite some time are especially encouraged to take part in the Quantum Future junior researchers competition.

Applicants are required to have a plant or branch (company) or another entity in Germany serving the non-commercial activities of the funding recipient (university, research institution) at the time of payment of the grant.

Research institutions which receive basic funding from the Federal Government and/or the *Länder* can only be granted project funding supplementary to their institutional funding to cover additional project-related expenditure or costs under certain conditions.

Concerning the conditions for when state aid is or is not deemed to be involved and the extent to which funding can be provided without constituting aid, please consult the Community Framework for State Aid for R&D&I.²

4 Special prerequisites for funding

Early-career researchers (applicants for funding) may submit a project outline with the agreement of the hosting higher education institution or research establishment. Applicants must have proven their ability to conduct independent research through possession of a doctoral degree and must demonstrate their aptitude to lead an independent working group.

At the time of project outline submission, applicants should have completed their doctorate at least two but not more than five years prior (date of PhD examination). Parental leave can be taken into account for the purpose of extending the relevant time period. Ideally, doctoral studies will have been followed by a research stay abroad as a post-doc, and applicants will have gained initial experience doing independent research. Job changes between research establishments during the applicant's scientific career are expressly welcome. A prerequisite for funding is that the university or research institution hosting the junior research group makes available the working facilities required for carrying out the project (resources in terms of laboratory space and equipment and other infrastructure) and supports the junior research group leader in all project-related matters. The junior research group is to be integrated into the existing structures of the higher education institution or institute yet remain autonomous in its research work. The group must work together at one site so as to enhance a sense of unity.

In their own interest, applicants should familiarize themselves with the EU's Framework Programme for Research and Innovation in the context of the planned national project. They should check whether the proposed project includes specific European components which make

² Commission Communication (2022/C 414/01) of 28 October 2022 (OJ C 414 of 28 October 2022, p. 1 ff.).

it eligible for exclusive EU funding. Furthermore, they should check whether an additional application for funding can be submitted to the EU in the context of the intended national project. The result of such checks should be described briefly in the national funding application

All funding recipients, including those which are research institutions within the meaning of Article 2 (83) GBER, must ensure that companies do not receive any form of indirect aid. The provisions of No. 2.2 of the EU Framework for State aid for research and development and innovation must be observed.

5 Type, scope and rates of funding

The projects will be funded for periods of up to five years depending on their specific needs. A milestone review including criteria for discontinuation will be conducted after three years. This will be followed by a decision on whether or not to continue the project.

– Staff costs or expenditure are only eligible for persons who are not explicitly covered by the institution's staffing schedule. Group size is limited to a maximum of five full-time positions. Positions may be shared among several people (exception: position of junior research group leader). The following will be eligible depending on the specific needs and technical requirements of the project:

- one position, salary grade 15 TVöD/TV-L (junior research group leader)
 - one position, salary grade 14 TVöD/TV-L (post-doc),
 - up to three positions, salary grade 13 TVöD/TV-L (doctoral student, post-doc),
 - one position (technical staff).
 - To a limited extent, academic assistants who are assigned routine tasks to be discharged under scientific leadership.
 - Additional funding may be made available for specific investments essential for doing the proposed research and which are either not available to the institution or have been exhausted.
- Other project-related expenditure and/or costs such as consumables are eligible for funding depending on the technical effort involved.
- Travel expenses of up to €60,000 are eligible for funding, depending on need and the size of the working group.
 - Funding for subcontracts for highly specific services or R&D activities will only be granted in justified exceptional cases.

In addition, initiatives which raise the visibility, also abroad, of quantum technology research and thus Germany as a research base are eligible for funding within a Quantum Future project. In this way, the academic junior research group can contribute to raising awareness of the funding measure, to the development of international partnerships and to the formation and expansion of research collaborations. Select ideas for networking will be granted a networking budget which the junior research group leader can use to plan and carry out activities that encourage exchange with international researchers and raise awareness of the funding measure.

Funding will be awarded in the form of a non-repayable project grant.

Grants for commercial companies and for projects of research institutions which fall into the category of economic activities³ will be calculated on the basis of the eligible project-related costs. Part of these costs can be covered, taking legislation on state aid into account (see Annex). The BMBF's policy requires that applicants make an appropriate contribution of their own towards the eligible costs incurred.

³ For the definition of 'economic activity' please refer to No. 2 of the Commission Notice on the notion of State aid (OJ C 262 of 19 July 2016, p. 1) and Section 2 of the Community Framework for State Aid for Research and Development and Innovation.

The basis for calculating the grants for higher education institutions, research and science institutions and similar establishments which do not fall into the category of economic activities is the eligible project-related expenditure (in the case of the Helmholtz centres (HZ) and the Fraunhofer-Gesellschaft (FhG), eligible project-related costs), which can receive up to 100% coverage in individual cases, taking into account state aid legislation.

In the case of non-commercial research projects at universities and teaching hospitals, a flat-rate grant amounting to 20% of total expenditure will be awarded in addition to the eligible expenditure funded by the BMBF.

Expenditure/costs which serve to provide the general public with access to the planned research process and/or its results during the funding period and to enter into a dialogue with society are eligible for funding. Science communication is the dialogue-oriented transmission of generally understandable information about scientific research to target groups outside the scientific community.⁴

Eligible expenditure/costs are governed by the BMBF's regulations governing applications for expenditure-based grants (AZA/AZAP/AZV) and/or cost-based grants (AZK) of commercial companies.

Carbon compensation payments for official travel can be recognized as eligible expenses or costs in accordance with the regulations governing applications for expenditure-based grants (AZA/AZAP/AZAV) and/or cost-based grants (AZK) of commercial companies.

The determination of the respective eligible costs and rates of funding must take account of the requirements stipulated in the GBER (see Annex).

7 Procedure

7.1 Involvement of a project management organization, application documents, other documents and use of the electronic application system

The BMBF has currently entrusted the following project management organization with implementing the funding measure:

VDI Technologiezentrum GmbH
 – Projektträger Quantensysteme –
 VDI-Platz 1
 40468 Düsseldorf

Contact:
 Dr. Fiona Grüll
 Phone: +49 211/ 6214-520
 Email: fiona.gruell@vdi.de

⁴ See also BMBF guide (FAQ) on science communication.

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The VDI Technologiezentrum GmbH is also the contact point for all matters related to administration of the funding measure.

Applicants are recommended to contact the project management organization for advice on applications. The organization will provide further information and details.

Any changes will be announced in the Bundesanzeiger (Federal Gazette) or in another suitable form.

Application forms, guidelines, information for applicants and the auxiliary terms and conditions are available online at

https://foerderportal.bund.de/easy/easy_index.php?auswahl=formularschrank_foerderportal&formularschrank=bmbf or can be obtained directly from the project management organization.

Applicants must use the 'easy-Online' electronic application system for drafting project outlines and formal proposals (<https://foerderportal.bund.de/easyonline>). This portal enables the electronic submission of the application, which must be submitted in writing. An electronic document that bears a qualified electronic signature is sufficient for electronic submission.

7.2 Two-phase application procedure

The application procedure consists of two phases.

7.2.1 Submission and selection of project outlines

In the first phase, descriptive project outlines must be submitted to the project management organization by 31 January of a calendar year in electronic form using the "easy-Online" application system (<https://foerderportal.bund.de/easyonline/>).

Projects are selected on an annual basis. The next deadline for submission of project outlines is 31 January 2024.

Project outlines must be written in English.

The final date for submission is 31 January 2026. This date is not a cut-off deadline, but it may not be possible to consider project outlines for the current selection round if they are received after the above date.

The project description contained in the project outline must be submitted according to the structure below (Nos. 1 to 7) and must not exceed 20 pages in length (DIN A4, Arial 11). Annexes as per No. 8 are not a component of the project description and must be submitted separately.

1. Project title and acronym
2. Name and postal address of applicant including phone number and email address
3. Objectives
 - a. Motivation and overall objective of the project, summary of the project proposal
 - b. Relevance of the project to these funding regulations and the corresponding area of application under No. 2
 - c. Relevance of the topic for industry and society

- d. Scientific and technological objectives of the project, envisaged innovation
- e. Expected contribution from the junior research group to the existing research focus areas of the institution and collaborations
4. State of the art and applicants' own previous work
 - a. Description of problem and current situation (comparison with international state of the art, intellectual property rights [held by applicant or third parties])
 - b. Novelty and attractiveness of approach, advantages over competing approaches
 - c. Previous work of funding applicant related to the objectives of proposed project
5. Work plan
 - a. Rough outline of the key scientific and technological issues as well as the proposed approach, definition of critical milestones; cooperation with third parties if appropriate (e.g. planned involvement of industry)
 - b. Network plan Work packages and intermediate objectives shown over time.
6. Utilization plan
 - a. Prospects for scientific-technological and commercial success
 - b. Prospects for scientific-technological and commercial follow-up
7. Strategy for the permanent establishment of the junior research group
8. Rough financial plan
9. Rough financial specification including rough cost estimate (types of costs and own resources/third-party funds)
10. Attachments:
 - a. Short CV outlining science career (from school-leaving qualification onwards), details of current employment, proof of completed PhD examination
 - b. List of major publications, patents etc.
 - c. Optional: Letter of support from industry

A legal claim to funding cannot be derived from the submission of a project outline.

The project outlines received will be evaluated on the basis of the following criteria:

- Innovativeness and quality of the scientific and technological approach
- Synergies with the existing research priorities of the applicant institution
- Strategy for the permanent establishment of the junior research group
- Scientific excellence of the Junior Research Group Leader
- Scientific and commercial relevance of the research topic.

The BMBF reserves the right to consult independent experts when evaluating the project outline. The evaluation may involve a pitch to be delivered by the applicant to an evaluation panel. To protect ideas which are in direct competition with the focus of other research groups, the project outline may include a blocking notice which identifies up to five experts who are excluded from access to the project outline.

The project proposals submitted will compete against each other.

Suitable project ideas will be selected for funding on the basis of the above criteria and evaluation. Applicants will be informed in writing of the result of the selection.

The project outlines and any other documents submitted in this phase of the procedure will not be returned.

7.2.2 Submission of formal applications and decision-making procedure

In the second phase of the procedure, the applicants whose project outlines have been given a positive evaluation will be invited to submit formal proposals. Each project partner must submit the appropriate expenditure-based grant and/or cost-based grant forms and a complete sub-project description.

An application for funding is only considered complete if at least the requirements of Article 6 (2) GBER (cf. Annex to these funding regulations) are fulfilled.

The "easy-Online" electronic application system must be used for drafting formal applications (taking into account the requirements set out in the Annex), (**Fehler! Linkreferenz ungültig.**). This portal enables the electronic submission of the application, which must be submitted in writing. An electronic document that bears a qualified electronic signature is sufficient for electronic submission.

In addition to the application forms themselves, applications for funding must include the following for each sub-project:

- Detailed description of the scientific and technological objectives of the sub-project, envisaged innovations,
- Detailed description of the sub-project work,
- Detailed work plan with information about staffing requirement for each work package,
- Detailed financial plan,
- Detailed description of the utilization of the sub-project results.

It may not be possible to consider applications received after the deadline stated in the notice inviting formal proposals.

The proposals received will be reviewed and evaluated according to the following criteria:

- Innovativeness and quality of sub-project, appropriateness of levels of aid
- Appropriateness of the cost estimate
- Definition of quantitative project aims
- Specific utilization plans
- Reason for funding requirement

A funding decision will be taken after final consideration on the basis of the above criteria and evaluation.