

Academic Year 2025

Multidisciplinary PhD Program
for Pioneering Quantum Beam Application

The University of Osaka

Application Guidelines

Institute for Transdisciplinary Graduate Degree Program



1. Overview of the “Multidisciplinary PhD Program for Pioneering Quantum Beam Application”

1) Purpose

Confronted with the reality of rapid aging and a low birthrate, our country must address the urgent tasks to extend the healthy life expectancy and realize a super-smart society with a clear vision of Society 5.0. Academia, including universities, are expected to address this issue and create new value through interdisciplinary cooperation. In this context, quantum beams created by accelerators are being applied in innovative ways to solve problems of modern society. Radioactive isotopes (RIs), which support nuclear medicine, have been essential in cancer research. RIs played a critical role in the rapid evolution of gamma imaging technology and targeted alpha-particle therapy. In addition, cosmic rays contribute to soft errors, which were originally discussed in devices operating in harsh environments such as space. However, due to the rapid development of the Internet of Things (IoT), cosmic ray-induced soft errors have also become an issue on the ground. Therefore, accelerated testing using quantum beams is urgently needed to evaluate and implement countermeasures. Despite the high potential of quantum beam applications, the development of human resources to support research and advance technologies is lagging.

This program aims to “continuously develop human resources to lead the creation of next-generation quantum beam application technologies” by targeting students mainly in the fields of science, medicine, and information technology in cooperation with domestic and foreign universities, institutions, and companies related to various quantum beams, including radionuclides, neutrons, and muons.

2) Student Attributes

Students accepted in the program are expected to be “intellectual professionals,” who will lead industry, government, and academia. They will acquire a high level of expertise, ability to comprehensively manage complex interdisciplinary issues, and the ability to compete at the international level. To achieve these goals, the program will develop students with the following qualifications:

- ① Ability to consider risks in terms of human sustainability
- ② Significant academic and technical knowledge in a specialized field
- ③ Ability to consider phenomena on various scales and academic fields
- ④ Experience and knowledge of advanced experiments and calculations in different fields
- ⑤ Ability to evaluate risks and benefits of the implementation of advanced technologies
- ⑥ Ability to develop and capitalize on human networks by taking a leadership role in international activities

3) Admission Policy

Students who wish to participate in the program must be committed to the purpose of the program and enthusiastic about acquiring the aforementioned qualifications (①~⑥ in section 1. 2), in addition to possessing a strong basic academic foundation and communication skills.

2. Eligibility for Application

Applicants must be a master's student or 1st year doctoral student of the Department of Physics, Department of Chemistry and Department of Macromolecular Science of the Graduate School of Science, the Department of Information Systems Engineering of the Graduate School of Information Science and Technology, and the Division of Health Sciences of the Graduate School of Medicine, or 1st year and 2nd year doctoral student of the Division of Medicine of the Graduate School of Medicine.

This programs and Next Generation Researcher Development Project can be taken in duplicate.

3. Program Capacity

A maximum of 12 students are accepted.

4. Application Procedures

☐Application Period 11 June (Wed.) ~ 17 June (Tue.), 2025

☐Application Documents "7. Application Documents"1)~7)

☐Application Method

Please complete all the following items within the application period.

(1) Sending application documents from the applicant by NII FileSender.

(1)-1. Be prepared to convert the application documents from 1) to 6) together into one PDF file. (Except for 7) the Evaluation Letter by the supervisor)

*File name: name.PDF (e.g. HANDAI Taro.pdf)

(1)-2. Send the file to the PQBA office via NII FileSender (large file transfer service).

*URL for sending application documents: NII FileSender (<https://filesender.nii.ac.jp/>)

*Submission email address: PQBA Office <info-pqba@rcnp.osaka-u.ac.jp>

*Subject: 'Application + full name'

(1)-3. After sending the application documents by NII File Sender, complete the Application Confirmation Forms.

Application Confirmation Forms: <https://forms.office.com/r/EHBC4C04Y2>

(2) Upload the Evaluation Letter "Form 4" from your supervisor to Forms at the following URL

Evaluation Letter form submission Forms: <https://forms.office.com/r/xVNFsfhU1t>

NII File Sender is large-capacity file transmission service provided by the National Institute of Informatics (NII). You will need your Osaka University personal ID and password. For details, please refer to the following manuals.

NII File Sender Utilizing Method (Written in Japanese):

<https://meatwiki.nii.ac.jp/confluence/pages/viewpage.action?pageId=67614082>

Method of login to the Academic Access Management Federation Japan (Written in Japanese):

<https://web.auth.osaka-u.ac.jp/gakunin/ds-login.html>

5. Schedule of Interview

10 July (Thu.), 2025

6. Selection Procedure

Students who wish to apply for the program must have a clear image of their research plan for the program by discussing it with their supervisor. The supervisor must certify that the consultation was completed by signing the certification statements on the Evaluation.

The selection process involves two stages:

1) Document Screening

Application Documents will be reviewed. Applicants who pass the document screening will be invited to an interview.

2) Interview

Applicants will be interviewed by faculty members of the PQBA. Applicants passing the document screening will receive detailed information regarding the interview schedule and preparing the presentation required for the interview.

| Selection Process | Period | Time | Location |
|-------------------------------|--|-------------------|--------------------------------------|
| Application Period | From 11 June (Wed.) To 17 June (Tue.) , 2025 | By 16:00pm | As per “4. Application procedure” |
| Document Selection Results | 30 June (Mon.), 2025 | 14:00 (tentative) | On the program website |
| Interview | 10 July (Thu.), 2025 | To be announced | Graduate School of Science |
| Final Selection Results | 23 July (Wed.), 2025 | 14:00 (tentative) | On the program website |

7. Application Documents

- 1) Examination Admission Slip (Form 1)
- 2) Application Form for the PQBA Program (Form 2)
- 3) Statement of Purpose and Research Plan (Form 3)
- 4) Transcript of undergraduate academic records
- 5) Transcript of graduate school academic records (applicable to 2nd year master's students, 1st year doctoral students and 2nd year students of the Division of Medicine, Graduate School of Medicine)
- 6) Master's thesis or equivalent (applicable to students of doctoral courses only)
- 7) Evaluation Letter (by a supervisor) (Form 4)

8. Notes on the Selection Process

The application number of those passing the document screening will be posted on the website of the "Multidisciplinary PhD Program for Pioneering Quantum Beam Application" on 30 June (Mon.), 2025. Inquiries about the selection results by phone or email will not be accepted. Only those passing the document screening will be interviewed. Additional details, including the interview location, will be announced on the program website.

9. Announcement of Final Selection Results

The application numbers of those passing the final selection will be posted on the website of the "Multidisciplinary PhD Program for Pioneering Quantum Beam Application" on 23 July (Wed.), 2025. Inquiries about the selection results by phone or email will not be accepted.

10. Application Fee

No application fee is required.

11. Registration Procedures

Those who are accepted to the "Multidisciplinary PhD Program for Pioneering Quantum Beam Application" must register for the program. The registration procedures will be posted along with the final selection results. There are no extra admission fees or tuition fees required to enroll in this program.

12. Start date of the program

1 October 2025

Students will be accepted into the program in October 2025. The credits earned by the summer semester of 2025 will be counted as credits of the program.

Please refer to the website for further details.

Website URL: <https://www.rcnp.osaka-u.ac.jp/pqba/>

13. Financial Support

The following financial support will be offered to those accepted by the program during the standard term of the course of study:

1) 2nd year of master's course:

- Maximum of approximately ¥480,000 per year for research assistant activities

2) Doctoral course:

- Maximum of approximately ¥1,000,000 per year for research assistant activities
- Tuition Fee Exemption

Regarding the research assistant activities by the doctoral students of the Division of Medicine, Graduate School of Medicine, 1) is applicable to 1st year students and 2) is applicable to the students of 2nd to 4th year.

Please note that the financial support may be terminated in case of extremely poor performance. The provision of the exemption may be changed according to the University's financial situation and other factors each year.

14. Handling of Personal Information

- The name, address, and other personal information submitted with the application will be used for the purpose of performing tasks related to the Doctoral Program for World-leading Innovative & Smart Education, including the selection process (application handling and selection test), announcement of selection results, and registration procedures.
- The personal information used for the selection process such as examination scores will be used only for purposes that contribute to the objectives of the program, including aggregating and analyzing the selection results, investigations and research of the selection method and analyzing the correlation with performance of those who finish the program.

15. Notes

- Incomplete application forms will not be accepted.
- As a general rule, changes to the content of the application documents after submission will not be permitted.
- Submitted documents will not be returned.
- An application number will be assigned after the application is received, and the examination admission slip with the application number will be sent to the laboratory to which the applicant belongs via intercampus mail.
- If the information provided in the application documents is found to be fabricated or falsified, enrollment permission to the program may be withdrawn even after acceptance into the program.
- If you have physical disabilities and require special arrangements for the selection test, please

contact the PQBA Administrative Office (info-pqba@rcnp.osaka-u.ac.jp) by 17 June 2025.

- Qs & As related to the application guidelines will be posted on the website of the “Multidisciplinary PhD Program for Pioneering Quantum Beam Application” (<https://www.rcnp.osaka-u.ac.jp/pqba/>) as necessary.

Inquiries :

Toyonaka Campus:

PQBA Administrative Office, Graduate School of Science, The University of Osaka

1-1 Machikaneyama-cho, Toyonaka, Osaka 560-0043, Graduate School of Science B building, 1st floor, Room B101

Email: info-pqba@rcnp.osaka-u.ac.jp Phone: 06-6850-5297 (Direct)

Suita Campus:

Research Cooperation Department, Research Center for Nuclear Physics, The University of Osaka

10-1 Mihogaoka, Ibaraki, Osaka 567-0047

Email: info-pqba@rcnp.osaka-u.ac.jp Phone: 06-6879-8904 (Extension 3169)