How to get to Nakamozu Campus (east gate)

Nankai Railway Koya Line:
From Shirasagi Station, approximately 1000m southwest
(about a 20-minute walk).

Nankai Railway Koya Line:
From Nakamozu Station, approximately 1,500m southeast
(about a 25-minute walk).

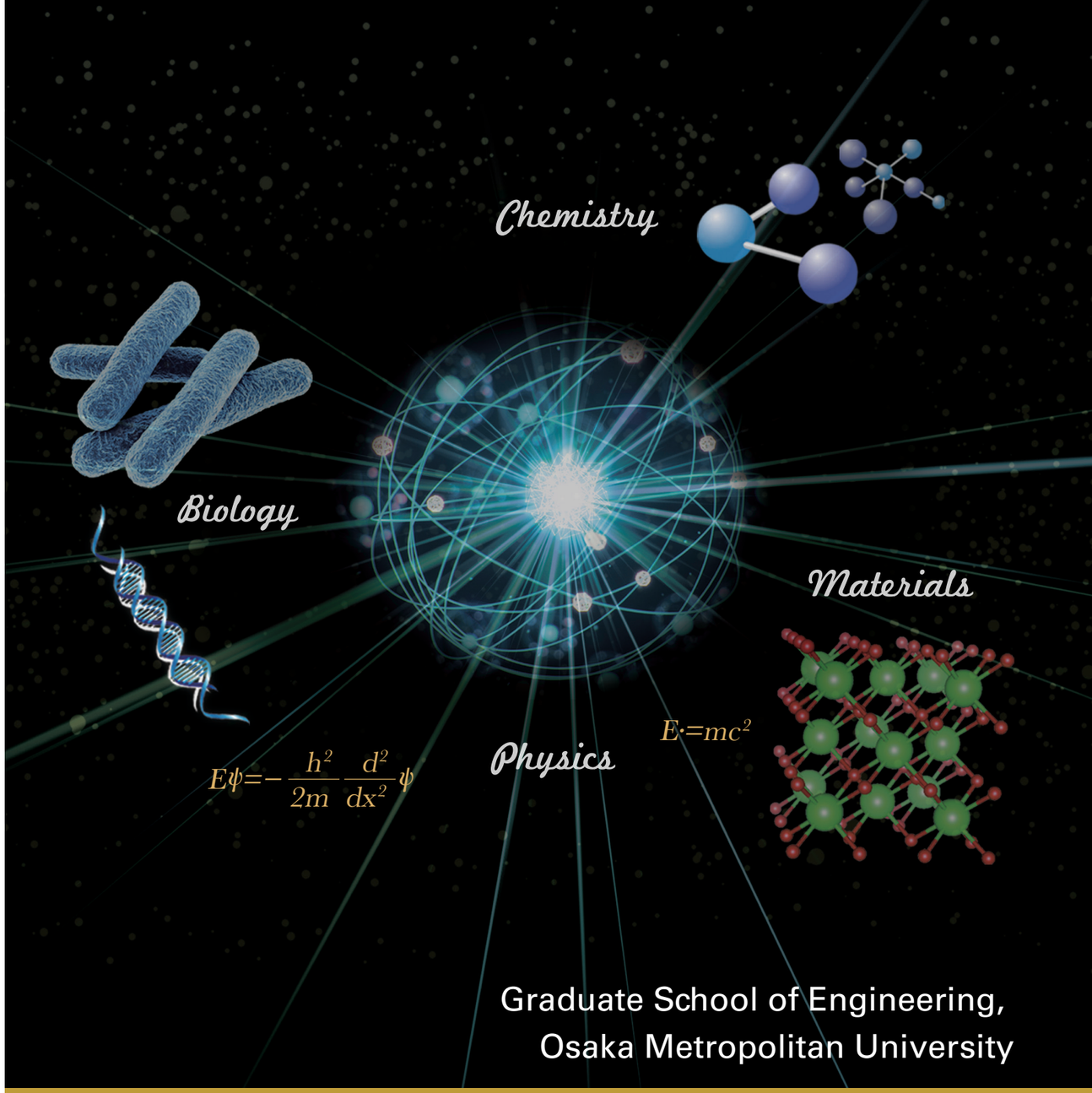
Subway Midosuji Line:
From Midosuji Nakamozu Station (Exit 5), approximately 1,500m southeast
(about a 25-minute walk).

Nankai Bus:
Take the bus (bound for Kitanoda Eki Mae, Route 131 or 131-C,132) at Nankai Railway Koya Line Nakamozu Station or Subway Midosuji Line Nakamozu Station (about a 6-minute ride) and get off at the Fudai Kenkyujyo Mae stop.

Nankai Bus:
Take the bus (bound for Kitanoda Eki Mae, Route131 or 132,132-C) at Nankai Honsen Sakai Station (about a 25-minute ride) or JR Hanwa Line Mikunigaoka Station (about a 15-minute ride) and get off at the Fudai Kenkyujyo Mae stop.

Osaka
Metropolitan
University

Osaka Metropolitan University, Graduate School of Engineering
Department of Quantum and Radiation Engineering
1-2 Gakuen-cho, Naka-ku, Sakai, Osaka 599-8531, JAPAN



Graduate School of Engineering,
Osaka Metropolitan University

Department of Quantum and Radiation Engineering

Osaka
Metropolitan
University

What is quantum and radiation engineering?

Quantum and radiation engineering is a research field in which new science and technology such as radiation, quantum beams and nanotechnology are applied to various fields.

Quantum radiation is currently widely used in medical fields such as X-ray diagnosis, cancer treatment and sterilization, in industrial fields such as non-destructive testing, ultra-fine processing, semiconductor technology and polymer polymerization, and in agricultural fields such as breeding. Quantum beams from accelerators are also widely used in today's innovative scientific research fields, where they are applied to advanced analysis and the development of new materials.

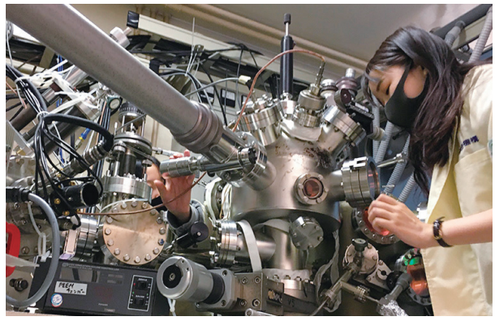
To manage such cutting-edge science and technology, it is necessary to acquire a broad knowledge of the applied fields in addition to advanced knowledge of quantum science and radiation. Furthermore, the human resources with knowledge of radiation protection, laws and regulations, food, and environmental safety, etc. are increasingly required.

Our department provides university students and working adults who have studied in various research fields with state-of-the-art research guidance in the fields of physics, chemistry, biology, medicine and materials, with our cobalt gamma irradiation facility and large clean-room facilities, and also trains highly specialized engineers and researchers who can play a leading role in various fields related to radiation.

The department trains highly specialized engineers and researchers who can also play a leading role in various radiation-related fields.

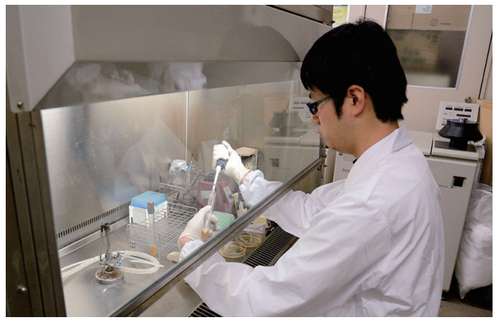
The department offers various lectures on the fundamentals of radiation, biological effects, safety management, material effects as well as quantum and nanoscience.

Focused ion beam apparatus installed in the clean room



X-ray Photoelectron Spectroscopy experiment for nano-materials at Photon Factory

Ion implantation experiment using an ion accelerator



Experiment for microbial control within clean bench securing biosafety

SUBJECTS

Advanced Quantum Science
Advanced Radiation Safety and Control
Radiation Chemistry·Bio-applied Science and Technology
Advanced Radiation Medicine and Protection
Advanced Science of Quantum Physical Properties
Advanced Science and Technology by Particle Beam
Advanced Devices for Quantum and Radiation Engineering
Advanced Nuclear Energy Technology
Advanced Quantum and Radiation Measurement
Advanced Sociology of Radiation
Advanced Seminar in Radiation Measurement
Advanced Radiation Engineering and Materials Science
Advanced Quantum Energy Science
Advanced Laser Engineering
Advanced electron and ion beam technology

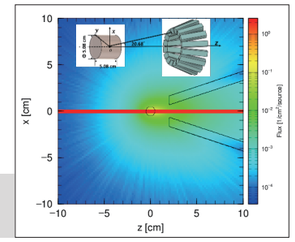
Research introduction

Our department is organized into five research groups: Radiation Metrological Science, Quantum Beam Materials Science, Radiation safety management, Quantum nano material science and Quantum beam energy reaction science.

Radiation Metrological Science Research Group

The philosophy of our research group is "to measure radiation" and "to analyze with radiation". Our group is developing new radiation detectors that incorporate AI, computer simulation, and advanced devices to flexibly respond to various radiation measurement requirements in today's society, such as radiation cancer treatment and nuclear safety.

Keywords:
radiation detection, radiation detector development, radiation simulation, radiation physics

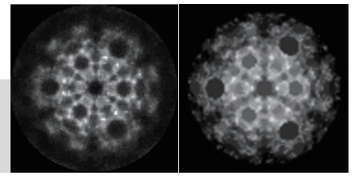


Response calculation of the developed anti-coincidence gamma detector.

Quantum Beam Materials Science Research Group

We are trying to clear the elementary processes of interactions between various quantum radiations and matter, develop analytical techniques for matter using these reactions, and develop new functional materials.

Keywords:
Quantum beam, Surface science, Nano structure

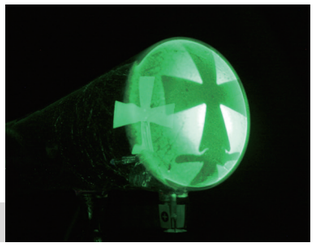


Mapping of scattered particles from insulator surfaces in a real-space lattice (radius 0.8 nm). Left and right pictures are shown experiments and simulations, respectively.

Radiation Safety Management Research Group

Basic study on safety system protocol relating with radiation source or radiation generator is our final target. Safety usage of crookes tube in high school education, heat road control in nuclear fusion reactor and effect of radiation damage, accurate dose calibration of ultra violet light or atmospheric plasma, and so on are included in this target.

Keywords:
Radiation management, Crookes tube,
Fusion plasma surface interaction
Biological effect of plasma and ultra violet light

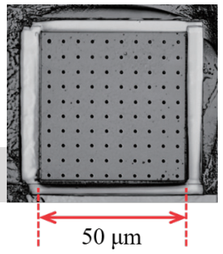


Crookes Tube for Elementary Education

Quantum Nano Material Science Research Group

We are exploring new physics phenomena and developing new devices by nano-fabrication of superconducting crystals by using quantum beam.
And we are also investigating energy conversion materials in order to establish society which does not use fossil fuel.

Keywords:
Nano-Fabrication, Superconductors,
Energy Conversion Materials

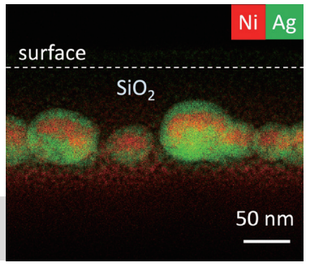


Anti-dot structure of a superconducting crystal fabricated by ion-beam

Quantum Beam Energy Reaction Science Group

We are engaged in research on phenomena occurring in reactions of various high-energy quantum beams using accelerators and synchrotron radiation, including radioisotopes, and their applications. Based on experiments and theoretical calculations, we are mainly explored in the development of functional materials by controlling the atomic level of materials through irradiation, and in the elucidation of atomic behavior in materials under radiation environments.

Keywords:
high energy beam, radiation effects, nanoparticle, amorphous, hydrogen in matter, functional materials, complex chemistry



AgNi nanoparticles in SiO_2 glass synthesized by ion irradiation.