博士研究員募集テーマ一覧

（別紙1）

No.	Recruitment Field	Contact Person	Department/ Section	E-mail	Research Theme	Radiation Worker/Non-Radiation Worker
1	Development of quantum algorithms and their demonstration using quantum computers	Ohshima Takeshi	Quantum materials theory group	ohshima.takeshi@qst.go.jp	Quantum algorithms for the efficient exploration of new materials and quantum defects are developed. Then, the calculations based on those algorithms are carried out using quantum computers and/or experimental studies are carried out to confirm the results obtained from calculations.	Radiation worker
2	Study to elucidate the fundamental principles of Ultrasound-induced brain activity modulation	Masafumi Shimojo	Institute for Quantum Medical Science Advanced Neuroimaging Center	shimojo.masafumi@qst.go.jp	We aim to visualize mechanoreceptors that are specifically expressed in neurons and glial cells within the living brain, and to elucidate their roles in maintaining brain homeostasis and in the progression of pathological conditions. By developing a device capable of delivering ultrasound with diverse parameters, and by utilizing each type of mechanoreceptor as an acoustic actuator molecule, we will also establish a novel ultrasound modulation technology that enables precise control of specific cell populations in the mammalian brain. These techniques will be applied to the brains of model mice for neurological disorders, facilitating the establishment of imaging-based diagnosis and therapy of disease progression.	Radiation Worker
3	Quantum materials research driven by advanced photoemission spectroscopy and measurement informatics	Iwasawa Hideaki	Quantum Matter Measurement Informatics Project	iwasawa.hideaki@qst.go.jp	Utilizing the high-brightness soft X-rays provided by the 3 GeV synchrotron radiation facility NanoTerasu, this project aims to develop multidimensional measurement techniques based on angle-resolved photoemission spectroscopy (ARPES), by integrating various experimental degrees of freedom such as spatial and spin resolution and/or external fields. Measurement informatics will also be employed to advance both measurement and data analysis methodologies. These technologies will be applied to investigate the electronic and spin states of quantum materials, including high-temperature superconductors and topological materials. By combining state-of-the-art instrumentation with data-driven analysis, the project seeks to accelerate the development of world-leading quantum materials research based at NanoTerasu.	Radiation Worker
4	Tracking and controlling ultrafast dynamics in material and biological science	Itakura Ryuji	Ultrafast Electronic Dynamics Project, Department of Quantum Applied Photonics	itakura.ryuji@qst.go.jp	Ultrafast photoexcited dynamics of complex metetial and biological systems will be investigated. In Kansai Insitute for Photon Science, ultrashort light sources such as few-cycle infrared laser and attosecond soft X-ray beam line by laser high-harmonic generation are being developled. Using such advanced ultrashort laser pulses, ultrafast coherenet spectroscopic measurement will be performed, leading to a novel method to visualized ultrafast dynamics in two-dimentional quantum meterials and photosynthetic systems with femtosecond/attosecond temporal resolution.	Non-Radiation Worker
5	Immunology for charged particle therapy	Hasegawa Sumitaka	Translational research group	hasegawa.sumitaka@qst.go.jp	The goal is to establish the biological basis for the combined therapy of charged particle therapy and immunotherapy. We will study the immune responses after charged partcile therapy using clinical samples and animal models.	Radiation Worker
6	Research on the biological mechanisms of radiation effects and its prevention	Tatsuhiko Imaoka	Department of Radiation Effects Research	imaoka.tatsuhiko@qst.go.jp	Even in the field of radiation biology, many issues remain unresolved regarding the long-term carcinogenic risks associated with low-dose radiation exposure. Recently, it has been suggested that radiation-induced cellular senescence and chronic inflammation play significant roles in carcinogenesis. However, there is still insufficient biological evidence. This study aims to clarify the roles of cellular senescence and chronic inflammation in radiation carcinogenesis by employing histopathological, cellular, and molecular biological techniques in mouse and rat radiation carcinogenesis models.	Radiation Worker
7	Research on high-current and high-energy negative ion beam souce for neutral beam injector for heating and current drive of fusion plasmas	Tobari Hiroyuki	NB heating technology group	tobari.hiroyuki@qst.go.jp	In order to develop a beam source that can stably generate a high-current, high-energy negative ion beam, experimental research on a high-current negative ion beam that can be uniformly extracted from a meter-calss electrode is examined through updates of the negative ion source that enables uniform production of high-density negative ions on a large electrodes and their temperature control teqnique and the magnetic field configuration of the ion source.	Radiation Worker
8	Sophistication of tritium breeder blanket design including ITER-TBM under various loading environments	Hirose Takanori	Rokkasho Institute for Fusion Energy,Department of Blanket Systems Research,Blanket Technology Group	hirose.takanori@qst.go.jp	A blanket is a crucial component in a fusion reactor, serving three main functions: fuel production, heat extraction, and neutron shielding. Because the blanket is subjected to severe loads in various environmental conditions, assessing its integrity is vital. In this study, we will base our assessment on the conceptual design of the ITER test blanket currently being developed by QST. We will evaluate the structural and nuclear integrity of the blanket under loads typical of the DEMO reactor, using thermal, structural, and neutron analyses. By considering the characteristics of existing blanket designs and structural materials, our goal is to enhance the blanket design to ensure both structural integrity and high tritium breeding performance.	Non-Radiation Worker
9	Study on tritium behavior for fuel cycle system of fusion reactor	Isobe Kanetsugu	Tritium Technology Group	isobe.kanetsugu@qst.go.jp	Tritium Technology Group is conducting basic research on tritium fuel cycle technology and tritium safe handling technology for a fusion demonstration reactor (DEMO), as well as the design of a new tritium handling facility. This research activity will contribute to the development of a fusion reactor engineering technology base for DEMO, and we are looking for a postdoctoral researcher to conduct research on tritium confinement and recovery in fuel cycle systems. The purpose of this study is to obtain an understanding of tritium behavior for the technology of suppression of tritium permeation and tritium recovery, and construct a basic database related to the safe handling of tritium.	Radiation Worker