

2020年4月入学 April 2020 Admission

広島大学大学院先進理工系科学研究科（博士課程前期）

# 学生募集要項

Graduate School of Advanced Science and Engineering (Master's Course)

## Application Guidebook

量子物質科学プログラム  
Quantum Matter Program

◆外国人特別選抜

Special Selection for International Students

2019年9月 September 2019



広島大学  
Hiroshima University

# Admission Policy of Graduate School of Advanced Science and Engineering

## Master's Course

The Division of Advanced Science and Engineering of the Graduate School of Advanced Science and Engineering seeks students who have the following aspirations and motivation and have the basic academic abilities necessary for it:

An ambition for the promotion of advanced and high-level academic and inter-disciplinary research;

The will to be engaged in professional occupations such as researchers and engineers in areas related to natural science, engineering, and information science;

A zeal for establishing the "science for sustainable development" from a multifaceted perspective and for solving regional and international issues by acquiring knowledge and study skills for the academic areas related to natural science, engineering, and information science as well as a wide range of intelligence; and

Common sense and ethics required for a member of society.

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Documents for application

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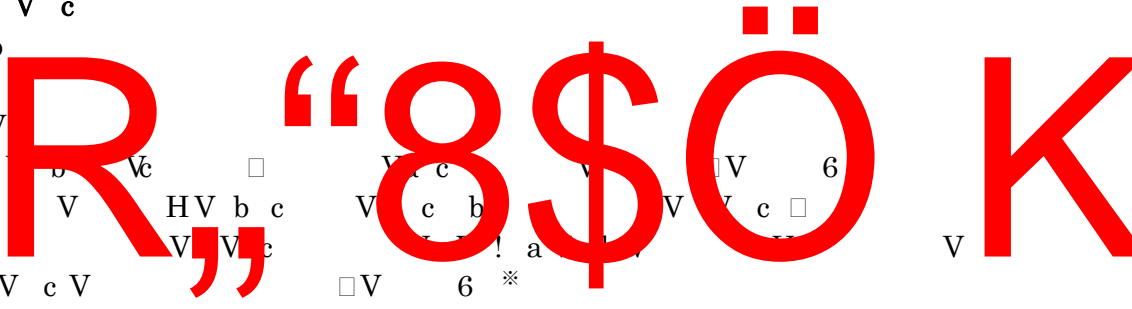
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## Lists of Academic Staffs and Research Subjects

### Quantum Matter Program

\* For more detailed information, please see AdSM website (<https://www.hiroshima-u.ac.jp/en/adsm>).

Position	Name	Subjects of Research	Examination
Professors	OKAMOTO, Hiromi	Study of charged-particle beams and non-neutral plasmas.	①
	ONIMARU, Takahiro	Experimental research on magnetic property of rare-earth compounds and thermal property of clathrate compounds. Macroscopic measurements and neutron scattering experiments are performed to reveal origins of new phenomena.	①
	KADOYA, Yutaka	Development of the devices for generation and detection of terahertz waves using ultrafast pulse lasers, and the devices for lightwave control using artificial material (meta-material).	①
	KURIKI, Masao	Theoretical and experimental study for beam dynamics. Research and development of high energy accelerator and its applications for light source, X-ray source. Research for high brightness (polarized) electron and (polarized) positron sources and study for photo-cathode and laser as key technologies of the high brightness particle sources.	①
	SHIMAHARA, Hiroshi	Mechanism of anisotropic superconductivity and interplay between magnetism and superconductivity in strongly correlated electron systems and quasi-low-dimensional systems. Superconductivity in high magnetic fields including the Fulde-Ferrell-Larkin-Ovchinnikov state. Magnetism in low and quasi-low dimensional systems.	①
	SUZUKI, Takashi	Experimental studies on the strongly correlated electron systems and new	

## Quantum Matter Program

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Position	Name	Subjects of Research	Examination
Associate Professors	YAGI, Ryuta	Experimental investigation of nano-scale physics. Quantum coherence, single electron phenomena and non-equilibrium transport are studied by fabricating extremely small structures and measuring low-temperature transport.	①
	UMEI, Kazunori	Studies of the thermal, transport and magnetic properties of rare-earth and transition-metal compounds under high pressures. Main research subjects are pressure-induced quantum critical phenomena of heavy-fermion systems, anomalous magnetism in geometrically frustrated systems under pressure, and pressure dependence of the quasi-localized vibrational modes in clathrates.	①
	MIYAOKA, Hiroki	Experimental study of fundamental material properties and reactivity for light elements based materials. Main subjects are research and development of hydrogen production, hydrogen storage, and material conversion. Functional materials are newly created through research on material properties and reaction mechanism by original sample synthesis methods and various analyses from wide points of view.	①
Lecturer	TOMINAGA, Yoriko	Crystal growth of semiconductor thin films and quantum structures, investigation of their optical characteristics, and development of novel optical devices.	①
Assistant Professors	IINUMA, Masataka	Experimental studies on quantum optics and its application; applications to quantum information science, fundamental physics, and bioengineering by quantum optical methods and techniques.	①
	ISHII, Isao	Experimental studies on the strongly correlated electron systems by means of ultrasonic spectroscopy. Our research focuses on novel physical properties originating from magnetism, multipoles, and a large-amplitude atomic oscillation under multiple extreme conditions.	①
	ITO, Kiyokazu	Experimental study on collective motions in charged particle systems. Application of non-neutral plasma systems to beam physics. Production of nano-ion beam sources.	①
	SAKAUE, Hiroyuki	Experimental studies on the fabrication of the surfaces and films with new properties by using 2- or 3-dimensional self-assembled integration of molecules and nanoparticles.	①
	SHIMURA, Yasuyuki	Single crystal growth of new rare-earth compounds and measurements for magnetic/thermal properties at very-low temperature mainly below 1 K, to find exotic phase transition and anomalous metallic state.	①
	HIGA, Nonoka	Experimental study in strongly correlated electron systems by means of neutron, resonant x-ray and nuclear magnetic resonance under multiple extreme conditions. We clarify the electronic properties on a microscopic point of view.	①

Academic staffs below are in charge of plural programs including this program.

Staff	Other Program
Professor EKINO, Toshikazu	Transdisciplinary Science and Engineering Program
Professor OGITA, Norio	Transdisciplinary Science and Engineering Program
Professor HIGASHITANI, Seiji	Transdisciplinary Science and Engineering Program
Assistant Professor SUGIMOTO, Akira	Transdisciplinary Science and Engineering Program
Assistant Professor NAGATO, Yasushi	Transdisciplinary Science and Engineering Program
Assistant Professor HASEGAWA, Takumi	Transdisciplinary Science and Engineering Program



## Quantum Matter Program

For more detailed information, please see AdSM website (<https://www.hiroshima-u.ac.jp/en/adsm>).

Position	Name	Subjects of Research	Research Field	Examination
Professors	HIGASHI, Seiichiro	Research on novel thin-film semiconductor processing techniques such as crystalline growth, low-temperature deposition of insulator films, and junction formation and their application to large-area electronics (solar cells, flat panel displays, etc) and ULSI devices.	Semiconductor Engineering	
	FUJISHIMA, Minoru	Research on system architecture, circuit design, layout optimization, active/passive device modeling and measurement for ultrahigh-frequency millimeter-wave and terahertz wireless communication and sensors with nanometer CMOS integrated circuits.	Ultrahigh-Frequency LSI and Systems	
	IWASAKA, Masakazu	Research on optical and magnetic properties of biogenic crystals and living cells in tissue engineering. Electromagnetic manipulation of biological materials in bio-MEMS for biomedical science and biotechnology.	Nanobio-Electro-magnetics Engineering	
	KUROKI, Shin-Ichiro	Silicon-Carbide (SiC) harsh-environment electronics for space exploration, decommissioning of nuclear power stations and medical, SiC power semiconductor devices and silicon thin-film devices.	Nanodevice Engineering	
	TERAMOTO, Akinobu	Research on device structures, advanced process technology, and evaluation system for advanced LSI, and research on new device structures, process technology of wide bandgap semiconductor (GaN) for power devices and high-speed communication.	Nanoprocess Engineering	
Associate Professors	AMAKAWA, Shuhei	RF/microwave/millimeter-wave CMOS circuit design. Circuit theory. Microwave and millimeter-wave measurement. Device characterization and modeling.	RF Electronics	
	SASAKI, Mamoru	Analysis, synthesis and design of architecture and RF circuit in CMOS technology. High-speed transceivers for wireless and wired communications between LSI chips. Development of design method combining communication, mount and circuit technique.	Integrated Systems	
	YOSHIDA, Takeshi	Low-power and low-noise circuit techniques for analog-digital merged system LSIs. Architecture and circuit technologies for Bio-Sensor LSI, which realize sensing a neural signal.	Advanced System LSI	
	KOIDE, Tetsushi	Architecture and circuit technologies for LSIs, which realize real-time recognition systems for flexible and intelligent information-processing based on reconfigurable logic-in-memory architecture approaches, and the systems development of medical / agricultural engineering applications.	Intelligent Integrated Circuits Engineering	
	NAKAJIMA, Anri	Researches of ultra small-size or new functional devices (such as quantum device and single-electron memory) and the development of atomic- or nano-scale process and large-scale integration technologies to make LSI more large and fast.	Nanoprocess Engineering	
	MIYAKE, Masataka	Model developments of unipolar and bipolar devices for circuit design, and their expansions to power devices with next-generation semiconductor materials.	Compact Modeling of Semiconductor Devices for Circuit Design	
Assistant Professors	HANAFUSA, Hiroaki	Development of new thin-film structure formation technology and research of its application to quantum-effect devices.	Semiconductor Devices and Materials	
	ZHANG, Zhao	Research on the design of low-jitter/low-power PLLs/Frequency Synthesizers/for RF and millimeter-wave transceivers, and clock and data recovery circuits for wireline communication transceivers.	High frequency & high speed ICs	