

English-based Program												
Department	Research Area	Research Instruction	Application Code		Main Supervisor	Vice Supervisor						
			Master	Doctor								
Department of Pure and Applied Physics	Mathematical Physics	Research on Mathematical Physics	Nonlinear partial differential equations arising in Classical Field Theory are studied from the viewpoint of functional and harmonic analyses.	J33	J83	Professor	Doctor of Science (Kyoto University)	OZAWA, Tohru	txozawa@waseda.jp			
Department of Pure and Applied Physics	Mathematical Physics	Research on Mathematical Physics	Theory of fully nonlinear elliptic/parabolic partial differential equations and its applications to sciences, engineering and economy are studied.	J47	J97	Professor	Doctor of Science (Waseda University)	KOIKE, Shigeaki	skoike@waseda.jp			
Department of Pure and Applied Physics	Theoretical Nuclear and Particle Physics	Research on Theoretical Nuclear Physics	The main subject is the theoretical study of nuclear structure. In particular, emphasis is placed on the study of infinitely-large hypothetical nuclei by quantum-mechanical many-body techniques (mainly the variational method). Also studied are related topics such as the internal structure of neutron stars.	J03	J53	Professor	Doctor of Science (Waseda University)	TAKANO, Masatoshi	takanom@waseda.jp			
Department of Pure and Applied Physics	Theoretical Nuclear and Particle Physics	Research on Fundamental Theory of Quantum Mechanics	Issues that are related with the foundations and/or the fundamental aspects of quantum mechanics are widely studied, with such topics as the mechanism of disappearance of quantum coherence and/or the appearance of irreversibility and dissipation in macroscopic/mesoscopic systems kept in mind. The particle physics is also within the research interest and has been studied in the context of the meaning and the method of quantization.	J04	J54	Professor	Doctor of Science (Waseda University)	NAKAZATO, Hiromichi	hiromici@waseda.jp			
Department of Pure and Applied Physics	Theoretical Nuclear and Particle Physics	Research on Theoretical Particle Physics	Based on the quantum field theory, we study theories of elementary particles and their interactions, especially, physics beyond the standard model of elementary particles. We also search the unified theory of elementary particles and the interactions.	J34	J84	Professor	Doctor of Science (Hiroshima University)	ABE, Hiroyuki	abe@waseda.jp			
Department of Pure and Applied Physics	Particle and Applied Radiation Physics	Research on High Energy Experimental Particle Physics	Interactions between elementary particles are studied at high energy frontier experiments. Based on experimental data taken at large-scale accelerator-experiments, researches are widely performed to verify various theoretical models and also to search for new particles/phenomena. In addition, we focus on an understanding of possible connections between cosmology and particle physics through experimental approaches.	J35	J85	Professor	Doctor of Science (Waseda University)	YORITA, Kohei	kohei.yorita@waseda.jp			

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Department of Pure and Applied Physics	Particle and Applied Radiation Physics	Research on Applied Radiation Physics	Our research group focuses on the high energy astrophysics experiments and data analysis using various satellite missions and balloon-borne experiments. We also conduct research and development for science/engineering crossover that shed new lights on medical and industrial fields. Specifically, state-of-the-art technologies for X-ray and gamma-ray imaging are being developed, toward future high precision proton therapy, three-dimensional multicolor X-ray CT, and radionuclide therapy.	J36	J86	Professor	Doctor of Science (The University of Tokyo)	KATAOKA, Jun	kataoka.jun@waseda.jp			
Department of Pure and Applied Physics	Particle and Applied Radiation Physics	Research on High Quality Beam Science	Fundamental science and application of laser light, electron beam, synchrotron radiation and other quantum beams are main subject. Especially, experimental research in the view point of physical chemistry between above mentioned beams and various kinds of materials will be conducted.	J37	-	Professor	Doctor of Engineering (The University of Tokyo)	WASHIO, Masakazu	washiom@waseda.jp	Professor	Doctor of Science (Waseda University)	YORITA, Kohei
Department of Pure and Applied Physics	Astrophysics	Research on Theoretical Astrophysics and Cosmology	High energy phenomena in compact objects such as supernovae, neutron stars and black holes are theoretically studied. In particular, the dynamics, gravitational radiation, neutrino interactions in hot and dense matter, nucleosynthesis and galactic chemical evolutions are the focus of research.	J06	J56	Professor	Doctor of Science (The University of Tokyo)	YAMADA, Shoichi	shoichi@waseda.jp			
Department of Pure and Applied Physics	Astrophysics	Research on Theoretical Astrophysics and Cosmology	We study theoretically consistent cosmological models and place observational constraints on them. In particular, we deal with the physical phenomena such as inflation, cosmic microwave background, large-scale structures, dark matter, dark energy, black holes, and neutron stars.	J02	J52	Professor	Doctor of Science (Waseda University)	TSUJIKAWA, Shinji	tsujikawa@waseda.jp			
Department of Pure and Applied Physics	Astrophysics	Research on Observational Astrophysics and Cosmology	Using the world cutting-edge observational facilities such as Subaru telescope and Atacama Large Millimeter/submillimeter Array (ALMA), we study formation and evolution of galaxies, super-massive black-holes, proto-clusters of galaxies and the large-scale structure of the Universe, cosmic reionization, and the intergalactic medium.	J48	J98	Professor	Doctor of Science (Kyoto University)	INOUE, Akio	akinoue@aoni.waseda.jp			
Department of Pure and Applied Physics	Theory of Condensed Matter Physics	Research on Physics of Non-equilibrium System	Interdisciplinary study of pattern formation and collective behavior in physical, chemical, biological, and social systems from the viewpoint of statistical physics and nonlinear dynamics.	J13	J63	Professor	Doctor of Science (Kyoto University)	YAMAZAKI, Yoshihiro	yoshy@waseda.jp			

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Department of Pure and Applied Physics	Theory of Condensed Matter Physics	Research on Theoretical Quantum Physics	Our interests lie in the fundamental aspects of quantum mechanics and quantum information. We are conducting theoretical researches on various quantum phenomena occurring in the microscopic and mesoscopic scales, and on the emergent quantum technologies making use of quantum correlations and entanglements.	J41	J91	Professor	Doctor of Science (Waseda University)	YUASA, Kazuya	yuasa@waseda.jp			
Department of Pure and Applied Physics	Theory of Condensed Matter Physics	Research on Nonlinear Physics	Research in our group focuses on applied and fundamental physics of non-linear and chaotic dynamics, quantum and wave chaos, and transport in many-particle systems.	J42	J92	Professor	Doctor of Science (Waseda University)	HARAYAMA, Takahisa	harayama@waseda.jp			
Department of Pure and Applied Physics	Theory of Condensed Matter Physics	Research on Emergent Materials Physics	We theoretically study a variety of physical phenomena and materials functions of magnets, ferroelectrics, metals, insulators and superconductors by constructing microscopic models based on the quantum mechanics and by analyzing them using mathematical and statistical-mechanical methods. We particularly focus on emergent phase-transition phenomena, nonequilibrium dynamics, nonlinear responses, device functionalities due to interplays of charge, spin, orbital and lattice degrees of freedom caused by strong electron correlations.	J44	J94	Professor	Doctor of Science (The University of Tokyo)	MOCHIZUKI, Masahito	masa_mochizuki@waseda.jp			
Department of Pure and Applied Physics	Condensed Matter Physics	Research on Complex Quantum Physics	Electrons in the crystal have various degrees of freedom, such as charge, spin, and orbital, and they are often correlated with each other. In addition, those degrees of freedom of the electrons can be coupled with external field, such as magnetic and electric field. To understand the complex behavior of the electrons in the crystal arising from such multi degrees of freedom, both synthesis of materials and the measurement of their physical properties are pursued in this lab.	J15	J65	Professor	Doctor of Science (The University of Tokyo)	KATSUFUJI, Takuro	katsuf@waseda.jp			
Department of Pure and Applied Physics	Condensed Matter Physics	Research on Soft Matter Physics	Liquid crystal (LC) is one of the most well-known soft matters, which possesses both the liquid-like fluidity and crystalline order. We especially focus on the dynamic properties of LCs and try to reveal the mechanism how the molecular-level motion should develop into the macroscopic dynamics.	J16	J66	Professor	Doctor of Engineering (The University of Tokyo)	TABE, Yuka	tabe@waseda.jp			
Department of Pure and Applied Physics	Condensed Matter Physics	Research on Atomic, Molecular and Optical Physics	Using intense, ultra-short and extreme ultra-violet laser pulses, we develop new approaches to measure and control electron dynamics of atoms or electronic and vibrational dynamics of molecules.	J38	J88	Professor	Doctor of Philosophy (The Graduate University for Advanced Studies)	NIKURA, Hiromichi	nikura@waseda.jp			

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Department of Pure and Applied Physics	Condensed Matter Physics	Research on Electronic Correlation Physics	Correlated electrons in the bulk or on the surface of solids provide surprisingly rich physical properties and useful functionality. We study the electronic structure of various solids by means of photoemission and x-ray spectroscopy, and try to find a novel quantum state or functionality due to electronic correlation.	J22	J72	Professor	Doctor of Science (The University of Tokyo)	MIZOKAWA, Takashi	mizokawa@waseda.jp			
Department of Pure and Applied Physics	Condensed Matter Physics	Research on Surface and Interface Non-equilibrium Physics	Researches on physical and chemical phenomena occurring in a material and on a surface, such as diffusion of atoms/ions and their reduction/oxidation processes. Development of conceptually new devices and systems based on the researches is also carried out.	J23	J73	Professor	Doctor of Science (Tokyo Institute of Technology)	HASEGAWA, Tsuyoshi	thasega@waseda.jp			
Department of Pure and Applied Physics	Condensed Matter Physics	Research on Low-dimensional Physics	Researches on physical properties and structure for low-dimensional materials such as thin film, surface/interface, one-dimensional chain and edge state by means of ARPES, STM and electron/positron diffraction.	J49	J99	Associate Professor	Doctor of Science (Tohoku University)	TAKAYAMA, Akari	a.takayama@waseda.jp			
Department of Pure and Applied Physics	Physics-Based Engineering: Informatics, Photonics and Image Science	Research on Semiconductor Device Engineering	Studies about compound semiconductors, related to quantum phenomena applicable to semiconductor devices	J25	J75	Professor	Doctor of Science (Osaka University)	TAKEUCHI, Atsushi	atacke@waseda.jp			
Department of Pure and Applied Physics	Physics-Based Engineering: Informatics, Photonics and Image Science	Research on Quantum Optics Research	Experimental studies of Quantum Optics. Research topics include generation of nonclassical light such as squeezed light and single photons, cavity QED, quantum information with photons, nanophotonics using microresonators and waveguides.	J40	J90	Professor	Doctor of Engineering (The University of Tokyo)	AOKI, Takao	takao@waseda.jp			
Department of Pure and Applied Physics	Physics-Based Engineering: Informatics, Photonics and Image Science	Research on Image Information Processing	My research is Image information processing covering from still pictures (2 dimensions) to stereoscopic animation (4 dimensions). They are including image understanding (Computer Vision), image modeling and synthesis (Computer Graphics). Not only do we make clear the visual organ but also consider human factors of sensitivity, emotion and personality that are difficult to make a model with numerical information processing approach.	J28	J78	Professor	Doctor of Engineering (The University of Tokyo)	MORISHIMA, Shigeo	shigeo@waseda.jp			

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Department of Pure and Applied Physics	Physics-Based Engineering: Informatics, Photonics and Image Science	Research on Fundamentals and Applications of Pattern Information Processing	The fundamentals and applications of pattern information processing and instrumentation are mainly studied. Our research projects include image processing, acoustic signal processing, tactile and haptic studies, robotics, neural networks and human interface.	J45	J95	Professor	Doctor of Engineering (Waseda University)	SAWADA, Hideyuki	sawada@waseda.jp			
Department of Pure and Applied Physics	Physics-Based Engineering: Informatics, Photonics and Image Science	Research on Integrated optical devices	The integrated optical devices based on silicon photonics are studied. The functional lasers, optical multiplexers and optical modulators for optical network system, optical interconnection and optical sensing are developed.	J46	J96	Associate Professor	Doctor of Material Science (Japan Advanced Institute of Science and Technology)	KITA, Tomohiro	tkita@waseda.jp			
Department of Pure and Applied Physics	Biophysics	Research on Theoretical Biophysics	Computer simulations, mainly molecular dynamics simulations, are applied to molecular machine systems composed of proteins and other biomolecules including DNA. Particularly, physical principles of how molecular machines works efficiently using different types of energies (e.g. chemical, mechanical, electrical, thermal, optical, etc.) are studied based on the statistical mechanics and electrostatics.	J31	J81	Professor	Doctor of Philosophy (The University of Tokyo)	TAKANO, Mitsunori	mtkn@waseda.jp			
Department of Pure and Applied Physics	Biophysics	Research on Molecular Biophysics	Experimental approaches to understand the molecular mechanism by which protein filaments and molecular motors work. Emphasis is placed on structural polymorphism of actin filaments, to unveil the principles and properties of protein machines that are distinct from artificial ones.	J30	J80	Professor	Doctor of Science (The University of Tokyo)	UEDA, Taro	t-uyeda@waseda.jp			
Department of Pure and Applied Physics	Biophysics	Research on Experimental Biophysics	The aim of this study is to understand the meaning and function of epigenetic information in living systems. A system of analyzing epigenetic information has been developed starting from the twin complementary viewpoints of cell regulation as an 'algebraic' system (emphasis on temporal aspects) and as a 'geometric' system (emphasis on spatial aspects). The knowledge acquired from this study may lead to the use of cells that fully control practical applications like cell-based drug screening and the regeneration of organs.	J43	J93	Professor	Doctor of Science (Waseda University)	YASUDA, Kenji	yasuda@waseda.jp			