



# World Premier International Research Center Initiative

世界トップレベル研究拠点プログラム

Vol.

17

Appendix  
(Selected Project in FY2021)

December  
2021

# Toward Enhancing and Strengthening "Highly Visible Research Centers"

## Background

An intensifying global demand for talented researchers is accelerating the need to circulate good brains among the world's nations. This trend has prompted Japan to establish new research centers that attract top-notch researchers from around the world so as to be a hub within global brain circulation.

## Program Summary

WPI provides concentrated support for projects to establish and operate research centers that have at their core a group of very high-level investigators. These centers are to create a research environment of a sufficiently high standard to give them a highly visible presence within the global scientific community—that is, to create a vibrant environment that will be of strong incentive to frontline researchers around the world to want to come and work at these centers.

## Formulation of new missions

In December 2020, new missions were formulated with the addition of "Values for the Future," and the enhancement of the four conventional missions: Science, Fusion, Globalization, and Reform.

## New WPI Mission

### World-Leading Scientific Excellence and Recognition

- The Highest Level of Research Impact
- Expanding Knowledge Frontiers through Interdisciplinarity and Diversity

### Global Research Environment and System Reform

- Harnessing Talent and Potential through Global Brain Circulation
- Interdisciplinary and Inter-organizational Capacity Building
- Effective, Proactive and Agile Management

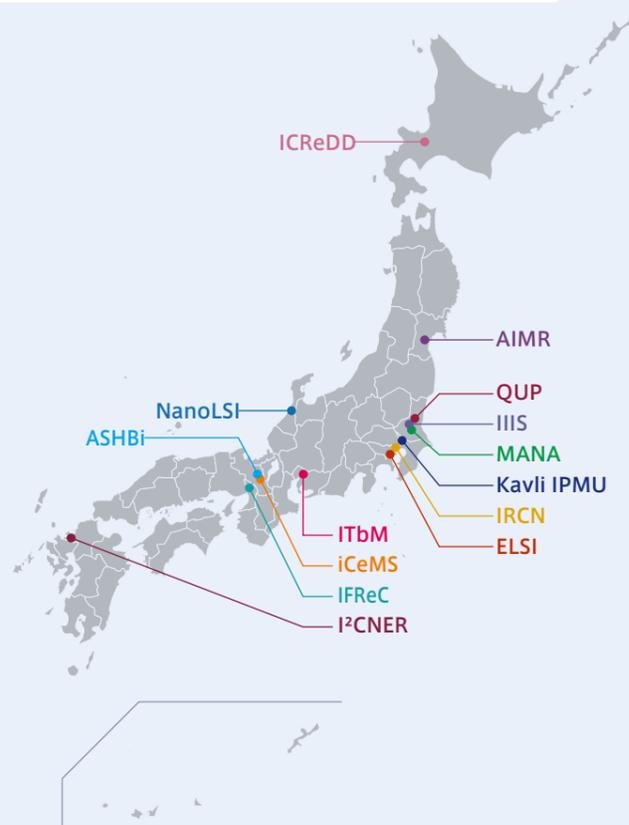
### Values for the Future

- Societal Value of Basic Research
- Human Resource Building: Higher Education and Career Development
- Self-sufficient and Sustainable Center Development



## WPI centers (total: 14 centers)

※QUP was selected under the new WPI missions. Previous 13 centers were selected under the conventional missions.



## WPI Academy

### Five centers adopted in 2007

- P.06** Tohoku University: Advanced Institute for Materials Research (AIMR)
- P.08** The University of Tokyo: Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU)
- P.10** Kyoto University: Institute for Integrated Cell-Material Sciences (iCeMS)
- P.12** Osaka University: Immunology Frontier Research Center (IFReC)
- P.14** National Institute for Materials Science: International Center for Materials Nanoarchitectonics (MANA)

### One center adopted in 2010

- P.16** Kyushu University: International Institute for Carbon-Neutral Energy Research (I2CNER)

### WPI Academy

The WPI Academy was launched in FY 2017 for maximizing the effect of the WPI Program by such means as: amplifying the experience and know-how acquired by the WPI centers as they worked toward achieving "World Premier Status" with regard to their research level; enhancing the profile and brand of the overall WPI Program; promoting global brain circulation; and internationalizing and reforming the scientific environment by networking the activities of WPI centers.

## Centers currently receiving funding

### Three centers adopted in 2012

- P.18** University of Tsukuba: International Institute for Integrative Sleep Medicine (IIS)
- P.20** Tokyo Institute of Technology: Earth-Life Science Institute (ELSI)
- P.22** Nagoya University: Institute of Transformative Bio-Molecules (ITbM)

### Two centers adopted in 2017

- P.24** The University of Tokyo: International Research Center for Neurointelligence (IRCN)
- P.26** Kanazawa University: Nano Life Science Institute (NanoLSI)

### Two centers adopted in 2018

- P.28** Hokkaido University: Institute for Chemical Reaction Design and Discovery (ICReDD)
- P.30** Kyoto University: Institute for the Advanced Study of Human Biology (ASHBi)

### A center adopted in 2021

- P.31** International Center for Quantum-field Measurement Systems for Studies of the Universe and Particles (QUP)

## Program Contents

**Funding period** | 10 years (up to 15 years for centers selected in or before FY 2012)

**Project funding** | About ¥700 million per fiscal year for each center (up to ¥1.4 billion per year for centers selected in FY 2007 and FY 2010)

**Evaluation** | Each year, a thorough follow-up review is conducted of the centers. A midterm evaluation is conducted in their 5th year and a final evaluation in their 10th year. These reviews are conducted by the Program Committee, comprising Nobel laureates and top-level researchers, and program directors and program officers.

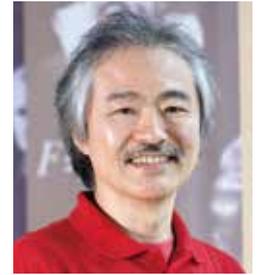
The Japan Society for the Promotion of Science assists in smoothly and effectively implementing the WPI Program.

WPI Website →





# Bringing new eyes to humanity to see this beautiful world



HAZUMI Masashi

The "quantum field" is the origin of everything.  
QUP will invent and develop new systems for measuring quantum fields.  
With these new systems, we will bring innovation to the human society,  
while working on the basic research on the space-time and matter of the universe.

## Message from HAZUMI Masashi , Director of QUP

Marcel Proust said, "The only real voyage of discovery consists not in seeking new landscapes, but in having new eyes."  
The quote precisely tells our spirit, and QUP brings new eyes to humanity to see this beautiful world (the true nature of space-time and matter.) I would like to make QUP a place where researchers from different fields can meet, ideas can spark, and dreams can come true. And I dream that QUP will become a cornerstone of human happiness in this way.

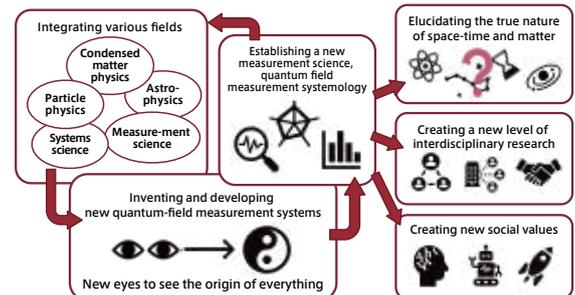
### [Purpose of the Research]

## Inventing and developing new quantum-field measurement systems

Quantum fields are space-time with particles and quasiparticles created and annihilated, and associated physical quantities.

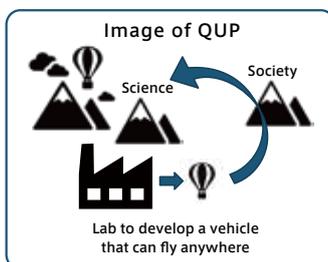
QUP aims to invent and develop new systems for measuring quantum fields by integrating particle physics, astrophysics, condensed matter physics, measurement science, and systems science. The new systems must bring innovation to measurements in cosmological observations and particle experiments, and elucidate the true nature of space-time and matter.

Furthermore, the new measurement systems create new social values through application to other fields and social implementation.



### [Unique Features of WPI Center]

## Conducting interdisciplinary research on "means" or "methodologies"



QUP will conduct interdisciplinary research on "means" or "methodologies." We are the only center in the world that integrates the invention of new measurement principles for experimental cosmology and particle physics, the development of systems to realize these principles, and the execution of projects.

Our unique approach will establish new measurement science, quantum field measurement systemology, as a science of means through the above practices and create a new level of fusion of various research areas beyond physics and new social values through application to other fields and social implementation.

### [Message from YAMAUCHI Masanori, Director General of KEK]

## Quantum-field measurement opens a door to the future research



QUP's goal to develop and invent the quantum-field measurement system is important for High Energy Accelerator Research Organization (KEK), as its various research platforms for vast fields of research including particle physics, material science, biology, and archeology are always requiring the better measurements. We will strongly support QUP's missions, including social implementation, and expect that the outcome of QUP accelerates the other researchers at KEK.

