World Premier International Research Center Initiative (WPI)
Progress Plan (For Final Evaluation)

Host Institution	The University of Tokyo	Host Institution Head	Makoto Gonokami
Research Center	Kavli Institute for the Physics and Mathematics of the Universe		
Center Director	Hirosi Ooguri	Administrative Director	Tomiyoshi Haruyama

Write your report **within 6 pages**.
* Use yen (¥) when writing monetary amounts in the report. If an exchange rate is used to calculate the yen amount, give the rate.

1. Mid- to Long-term Research Objectives and Strategies Based on the Center's Results during Funded Period

Describe new challenges in the Center's research objectives and plans after the funding period ends. If major adjustments will be made in the Center's operation, such as newly set research themes/objectives or a change in the director, describe the strategic background to the adjustments.

The mission of the Kavli IPMU is to discover fundamental laws of nature and to use them to address the questions about the Universe; how it was born, how it evolved, and what the future will be. Our long-term objectives are to solve these problems by integrated efforts of mathematicians, physicists and astronomers. Immediately after H. Ooguri became the Director in the fall of 2018, he initiated the Long Term Strategic Planning Exercise of the Kavli IPMU. It identified the following three areas as the institutional priorities in experimental physics and observational astronomy:

- CMB Projects
- Kamioka Projects
- Survey Astronomy Projects.

Each of these projects involves multiple faculty members of the Kavli IPMU, and a large fraction of our resources will be invested in them. All these projects are consistent with Kavli IPMU's mission. Cosmology and neutrino physics are making significant progress and there are also opportunities for synergies among these projects. We expect that these investments will bear fruits over the next five to ten years, and it is important to ensure their successes. In addition to these priority areas, we will also support projects conducted by single PI's as well as theoretical research.

1.1 CMB Projects

The Kavli IPMU is participating in POLARBEAR/Simons Array and the Simons Observatory. We are playing a major role in the Simons Observatory upgrade. The experiences we have gained in this project are important for us to take the leadership in the Japanese project, LiteBIRD.

ISAS (the science division of JAXA) has approved the launch of the LiteBIRD satellite, currently scheduled in November 2029. The Kavli IPMU is a lead institution for its Master Plan 2020 proposal to the Science Council of Japan and is expected to contribute to the project with development of polarization modulators and hosing of the data analysis center.

Currently, there are three faculty members working on CMB projects. Assuming that LiteBIRD will receive a final approval by JAXA and is fully funded both for the polarization modulator development and the data analysis center, in a steady state of the project, we plan to keep the current size of faculty on CMB projects.

1.2 Kamioka Projects

The Kavli IPMU is involved in several projects at the Kamioka Observatory.

SK-Gd: This project is a fulfillment of the idea of Kavli IPMU PI M. Vagins and his collaborator J. Beacom. Since 2020, the gadolinium is being added Super-Kamiokande, and the sensitivity is expected to increase substantially in the coming years. It will make it possible to detect signals of supernova relic neutrinos and of anti-neutrino spectrum from nuclear reactors.

T2K: Full physics operation started in 2010, with the best constraint on δ_{CP} by summer 2017. T2K is expected to become an important partner of the Hyper-Kamiokande project described below. A couple of our faculty members are involved in this project.

Hyper-Kamiokande: The construction has started and is in steady progress despite the COVID-19 pandemic.

1.3 Survey Astronomy

Hyper Suprime-Cam (HSC) and Prime Focus Spectrograph (PFS) are flagship projects of the Kavli IPMU. Currently, there are 5 full-time faculty members, 7 affiliates, 10 postdocs, 5 students working on them. The Kavli IPMU has played critical roles in funding and leadership of these projects. HSC has already had great success with its early science results, in particular with the weak lensing survey, and more results are expected with full data set. PFS will play a complementary role with highly multiplexed, deep, wide redshift survey. The instruments are being assembled in Hawaii.

To make the most of HSC and PFS, close collaborations with other survey projects worldwide are essential. Rubin Observatory (LSST) will be the main survey project for the coming decade. It is a natural synergistic extension of HSC and PFS, and there are opportunities to make an impact with our experience with these projects. Coordinating with NAOJ, we are negotiating with the Rubin Observatory on in-kind contributions to the project, which will include providing substantial computer time for data analysis. WFIRST is expected to be launched in October 2025. Subaru is supposed to contribute 100 nights. Data analysis support, in particular interface to data is going to be important.

1.4. Single PI Projects

There are several projects conducted by single PI's. Scientifically, they are all excellent projects and we will continue to encourage such activities:

Belle II: This is a major national project following the successful Belle experiment, which verified the theory of Kobayashi and Maskawa, leading to their Nobel Prizes. The Kavli IPMU group successfully completed the semiconductor detector production and delivery in 2018, and the experiment started in March 2019. Subsequently, our group has made a successful transition to data analysis.

XENON-nT: The Kavli IPMU is making an impact on the project with its contribution of the gadolinium technology from Kamioka, eliminating the need for the problematic liquid scintillator.

Medical Applications of Gamma-Ray Imaging: It is important to explore opportunities like this one to make our basic science research useful to the society. Currently, the project is funded by grants for T. Takahashi, with a laboratory at the National Cancer Center. It provides opportunities for us to make societal impacts.

1.5. Theoretical Research

Project-style research is not suited to theoretical studies. Nevertheless, there are a few important topics about which we expect to make significant contributions.

Mathematics and Theoretical Physics: Collaborations between our mathematicians and theoretical physicists have been very successful and have yielded many noteworthy results until today. We will maintain such interactions. Our challenge in the coming decade is to expand the frontiers in algebraic geometry toward other areas in mathematics and theoretical physics.

One of the important issues is to study the categorical aspects of quantum field theories (QFT). A few years ago, the concept of perverse schobers was proposed by a Kavli IPMU researcher (M. Kapranov), which are categorical analogs of perverse sheaves. The work up to now indicates that perverse schobers provide, among other things, a mathematical framework for the study of 2 dimensional QFT in the infrared limit (the Algebra of the Infrared of Gaiotto-Moore-Witten) as well as for induction-restriction formalism of Representation Theory. Developing a solid mathematical foundation of this theory is a challenge.

Another related issue is the study of moduli spaces of coherent sheaves on algebraic varieties. Those sheaves also appear in supersymmetric gauge theories in theoretical physics. Many quantum field theoretic quantities, such as partition functions, correlation functions, are expressed as integrals over moduli spaces. Even more, finer objects, such as Hilbert spaces in quantum physics, could be related to moduli spaces. Thus, studies from the mathematical side will give tools to compute physical quantities. On the other hand, research in physics will provide different ways to look at moduli spaces, and lead to the existence of structures that are unexpected in mathematical studies. We hope that our planned studies on moduli spaces may give new insights into other fields of mathematics, such as representation theory, number theory, and so on.

Astrophysics, Cosmology and Particle Physics: In the areas of astrophysics and particle physics, there is an important unsolved issue, i.e., the nature of dark matter and dark energy.

With the planned world-leading projects mentioned above at hand, our challenges are to develop an efficient analysis method that can deal with the big data delivered by those projects. The planned surveys are aimed at collecting images of billions of galaxies and stars. Data to be delivered by those surveys typically exceed tens of petabytes. Real-time analysis of the sheer volume of data is a real challenge. It necessitates us to develop efficient data analysis methods using machine learning. The expected scientific outputs and the potential of unexpected discovery heavily rely on how well astronomical/cosmological information can be extracted from the large data set. We will make a concerted effort with astronomers, physicists, mathematicians, and computer scientists to develop such a method to develop a "machine" that automates data analysis and scientific discovery from the large observational programs.

As for theory, diverse studies on dark matter have been performed at the Kavli IPMU for various candidates ranging from ultralight to macroscopic ones. For example, Primordial Black Holes (PBH) as a macroscopic candidate, Electro-Weakly Interacting Massive Particle (EWIMP) as a heavy particle candidate, Weakly Interacting Massive Particle (WIMP) as a typical particle candidate, sterile neutrino as a non-thermal light candidate, Strongly Interacting Massive Particle (SIMP) as a thermal light candidate, dark photon as a very light particle candidate, axion as an ultralight (wave-like) candidate. Through these studies, we proposed concrete models, found new mechanisms on dark matter processes, suggested experimental methods to test the candidates, and contributed to dark matter search projects by showing the nature of each candidate. We will keep developing such theoretical models, in particular, through various international and interdisciplinary collaborations with other fields, i.e. astrophysical observations (HSC, PFS) for pBH/EWIMP/WIMP/SIMP, TeV gamma-ray observations (CTA) for EWIMP/WIMP, MeV gamma-ray observations (COSI) for WIMP/sterile neutrino/SIMP, underground experiments (XENON) for EWIMP/WIMP, chemical synthesis (new direct dark matter detection) for SIMP/dark photon, and precision physics (Atomic clock, GW) for axion, hadron collider experiments (HL-LHC) for EWIMP/WIMP, lepton collider experiments (Belle II, ILC) for WIMP, SIMP, and so on.

Quantum Information Theory: The Kavli IPMU is a member of the Trans-Scale Quantum Science Institute, a crosscutting research platform for quantum science including cosmology, particle physics, condensed matter physics, quantum information and mathematics at the University of Tokyo. Theoretical physicists at the Kavli IPMU are involved in applications of ideas and techniques of quantum information theory to advance our understanding of quantum gravity. We are also expecting that insight gained in quantum gravity theory can be useful in quantum computers and quantum cryptography. In addition to faculty members working in this area, we are supporting research activities at the interface of quantum information and quantum gravity with postdocs appointments and conferences.

2. Management System of the Research Organization

2-1. Describe the Center's Research Organizational Management System that will Execute the Research Strategy and Plan Described above.

- In Appendix 1-1, list the PIs who will ensure that the Center's project is sustained and advanced after the funding period ends.
- In Appendix 1-2, enter the number of Center personnel (researchers, research-support staff, and administrative staff) in FY 2022
- In Appendix 2, diagram the Center's organizational management system.

To secure success in the above research objectives, human resources are essential. We will maintain our high standard in recruiting new faculty members and hiring postdocs from all over the world. In 2021, the Kavli IPMU has launched the diversity initiative to promote the diversity and inclusion in our institute and spread successful practices within the University of Tokyo and throughout Japan.

A few PIs are assigned to each of the main objectives 1.1, 1.2 and 1.3, so that the scopes of research will be as wide and deep as possible. To further enhance international collaborations, the Kavli IPMU is taking part in collaborative agreements with IN2P3/CNRS, France, in the areas of CMB, neutrino physics and survey astronomy, together with ICRR, University of Tokyo. For the single PI projects as well as theoretical projects, each PI or faculty member will tackle their respective objectives. To encourage mutual interactions and multidisciplinary collaborations, we will keep our tradition of daily teatime at 3 pm.

Currently, some of our PIs are faculty members of the Kavli IPMU and others are associated with other institutions. The job descriptions in comparison to those of tenured faculty members (full and associate professors) have not been well-defined. We are currently reviewing both the PI system and the faculty system and will come up with a coherent personnel system and document them.

Similarly, we are also working on a personnel manual that describes rules governing faculty recruiting and promotions. Documenting these rules is important to ensure that everyone is treated fairly and consistently. This is particularly important in promoting the diversity and inclusion and in attracting talented researchers from all over the world.

Our supporting and administrative staffs are also among the most efficient in the world. We will maintain their high quality by properly assigning their duties and clearly defining their responsibilities.

Currently, the Kavli IPMU is managed with the strong leadership of the Director, and the steering committee chaired by the Director is its decision-making body on important matters such as faculty hiring and promotion. This top-down management structure allows timely decisions on recruitments, retentions, and resource allocations. The organization remains flat with no "departments" within the institute, and the directorate is always open to new initiatives from the individual faculty members. We intend to maintain this administrative structure in coming years.

2-2. Initiatives and Plans that will Impel System Reforms

- Describe the Center's action plan that embodies the basic policies of the University Reform Plan, and the Center's plan and strategies that lead to host institution reforms either directly or via ripple effects (also to other institutions, if applicable). Describe also the Center's strategies for fostering and securing the next generation of researchers (e.g., introduction of tenure tracks), and the system reform for enhancing the Center's organizational management, such as the implementation/verification PDCA system.
- Describe your plan for sustaining and enhancing the WPI brand.

The Kavli IPMU has been successful in implementing system reforms. They include:

- establishing the environment to concentrate the research
- split appointments with institutes outside Japan
- merit-based salary system
- global standard for the hiring system
- "nenpo" system

The successful reforms of the system and organization within the Kavli IPMU should not stay confined within our Institute. Already, many of our accomplishments are taken up by the University administration. We take the role of an evangelist to make these reforms permeate the system to boost the overall competitiveness of research in Japan. One of the examples we have achieved to spread these reforms can be seen in the Administrative Director's contribution to Tokushima University on the program established by the Cabinet Office project "Promotion of Regional Industries and Universities". He gave a lecture to the President and board members of Tokushima University on the detailed successful experience of the WPI program at the Kavli IPMU. He has been assigned as a member of the External Evaluation Committee of the newly established laboratory at the university.

As an important aspect of fostering and securing the next generation of researchers, recently we have established a new tenure track system. A tenure track assistant professor is hired for the initial seven years, and through the process of mid-term review and the following final review, the candidate can be a tenured associate professor. Also, we are planning to form a standing committee to search for talented young researchers, especially for female and minority researchers. We defined the Kavli IPMU code of conduct to guarantee the diversity initiative research environment and it was developed to the University's code of conduct later.

Regarding the education of young people including undergraduate students, a successful program between Oxford University and the Kavli IPMU since 2015 has been producing a couple of PhDs every year. So far, we have accepted nine students, and five have defended their Ph.D. theses. In addition to that, the excellent graduate student program WISE is accepted by MEXT and the faculty members in Kavli IPMU can officially approach to foster students.

The Kavli IPMU is now recognized as the one of the prominent WPI institutes from over the world. We are obliged to keep this WPI brand even after the WPI full support is terminated. So, what is the WPI brand? We recall the four missions of the WPI: science, fusion, globalization and system reform. For science and fusion, we will enter the fruitful season of the world top class projects soon and high visibility can be achieved through those results. We will make further effort to keep the present world top level researchers stay inside the institute by guaranteeing the excellent research environment as it is. Fortunately, we have been keeping around 50% fraction of foreign researchers for many years. This implies that our institute is comfortable for many foreign researchers to accomplish their advanced research. This is the results of system reform done under the strong motivation as the WPI institute for 14 years. We will always conscious of what we have done and how to challenge for the next step to reach a much higher level.

3. Plan for Promoting the International Circulation of World's Best Brains

Describe your policy and concrete plan for promoting the international circulation of the world's best brains, which is an important function of the WPI Academy.

Our program to keep requiring our postdocs to spend at least a month up to three months per year visiting institutions abroad has been done successfully for a long time. By this young researchers' activities, the name of Kavli IPMU spread all over the world in this decade and a half. Also we invited many world-top researchers as well as young researchers with high potential. In addition, we established named visiting professorships and fellowships. These efforts have been the key to achieve our international composition with almost half of the researchers being non-Japanese nationals. Every year, about half of 800-1000 visiting researchers are from abroad. The international solicitation for postdoc plays the key and important role for the young excellent brain circulation. About 700 applicants annually compete for about 12 Kavli IPMU postdoc positions. The short-listed candidates are excellent, and about 30 % of full number of offers are normally accepted. After three years postdoc research, about a half of "graduate" postdoc normally found tenure, or tenure-track faculty positions at universities, research organizations. After leaving the institution, many active researchers are assigned as affiliate members of the Kavli IPMU. We support traveling and staying accommodations to make it easy to visit us. New collaborative research between inside researcher and affiliate member is expected to be commenced in such occasion.

4. Center's Position within Host Institution and Measures to Provide It with Resources

Describe the Center's future plans with regard to the following points after the funding period ends.

4-1. From a Mid- to Long-term Perspective, the Position of the Center within the Organization of the Host Institution

Describe where the Center will be placed within the host institution's overall organizational strategy under the leadership of the institution's head.

- In Appendix 3, diagram the Center's position within the organization of the host institution, and describe that positioning using excerpts from the institution's mid- to long-term plan. If the plan has not been established yet, describe the consideration being given to the Center's positioning.

The University of Tokyo recognizes that the Kavli IPMU is the flagship of the University, and the successive Presidents of the University have expressed their commitment to the Kavli IPMU at many WPI occasions, such as meetings of the Program Committee, Site visits, and follow-up visits.

In March 2021, UTIAS (University of Tokyo Institute for Advanced Studies) approved that Kavli IPMU to stay continued as a research organization within UTIAS. The criteria of these qualifications are: the institute should be evaluated as an excellent international research initiative, world top-level researches are active there, enough running budget is secured, and enough globalization of research environment has been achieved.

In April 2021, new President T. Fujii pointed out three important strategies in his inaugural message. Those are: conversation in person, diversity and inclusion, and visible and centripetal UTokyo.
In his address,
"Diversity and inclusion are fundamental not only in the creation of academic knowledge, but also to human resource development, university management and partnerships with society…. In addition, we will gather outstanding people with diverse backgrounds from around the world as faculty, staff and students, and create a place where they can thrive".
"By realizing a digital campus that promotes digital innovation throughout education, research and administration, we aim to improve the quality of faculty and staff members' time and work, and make UTokyo a place of learning where people from around the world will want to come and join".

The President is now preparing the institution's mid-to-long-term plan which will match with the Fourth Term Mid-term Target.

4-2. Host Institution's Action Plan for Sustaining and Advancing the Center as a World Premier International Research Center (e.g., Positioning, Financial Resources)

- In Appendix4, describe the host institution's resource allocation plans for the Center, including the allocation of posts (in both its research and administrative divisions).

In March 2021, the University of Tokyo approved our proposal to place the university funding for the Kavli IPMU in the core expenses category, at about 1 billion yen per year. Being part of the core expenses

category means that the funding is permanent. The Kavli IPMU is also keeping its status as a research organization inside UTIAS guaranteed its special managing system. These actions reflect University's commitment to sustain the Kavli IPMU as a permanent institute, both in terms of finances and administrative arrangements.

The Kavli IPMU has already secured 26 permanent positions for the core of faculty to guarantee excellent activities of the Kavli IPMU as it is. Most positions are assigned to core faculty. The University secured also 9 UTokyo permanent administrative staff. In addition, the university has decided that termed administrative staff should be hired as permanent positions including bilingual staff. It means that the many supporting staff for the foreign researchers can stay in the Kavli IPMU. The loan for the main building has already completed and three rooms at the second complex building are free for us. UTIAS is an outstanding support system allowing the Kavli IPMU to operate as an incubator of systems reform within the University.

In 2020, the Kavli Foundation decided to increase the Kavli IPMU endowment by $10 million, guaranteeing a stable source of discretionary research funding. The Kavli Foundation has also committed to provide matching fund up to $2 million to help fund raising of UTokyo for more support for the Kavli IPMU. These actions reflect the trust and appreciation of the Kavli Foundation on the Kavli IPMU regarding its high level of research activities and the stewardship of the endowment.

The grant from Hamamatsu Photonics has been renewed for 5 years from 2019 to 2023.

The University of Tokyo is committed to maintain the excellent research environment for the Kavli IPMU to function as a world premier leading institute.

Appendix 1-1 List of Principal Investigators (for Progress Plan)

* If the number of principal investigators exceeds 10, add rows as appropriate.
* Give age as of 1 April 2022
* For investigators who cannot participate in the center project from FY 2022, indicate the time that their participation will start in the "Notes" column.
* Enter the host institution name and the center name in the footer.

	Name	Age	Current affiliation (position title, organization, department)	Academic degree and current specialties	Effort(%)*	Notes (Enter "new" or "ongoing")
1	Hirosi Ooguri	60	Director Kavli IPMU, UTIAS, The Univ. of Tokyo Director and Fred Kavli Professor Walter Burke Institute for Theoretical Physics California Institute of Technology	Ph.D. Theoretical Physics (Mathematical Physics)	50	ongoing
2	Hiroaki Aihara	66	Deputy Director Kavli IPMU, UTIAS, The Univ. of Tokyo Executive Director and Vice President The Univ. of Tokyo	Ph.D. Experimental Physics (High Energy Physics)	30	ongoing
3	Alexey Bondal	60	Professor Steklov Mathematical Institute Project Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Mathematics	40	ongoing
4	Kentaro Hori	56	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Theoretical Physics (String Theory)	80	ongoing
5	Kunio Inoue	56	Professor, Director Research Center for Neutrino Science, Tohoku University	Ph.D. Experimental Physics (Neutrino Physics)	45	ongoing
6	Takaaki Kajita	63	Director, Professor ICRR, The Univ. of Tokyo	Ph.D. Experimental Physics (Neutrino Physics)	10	ongoing
7	Mikhail Kapranov	59	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Mathematics	100	ongoing

*Percentage of time that the principal investigator devotes to working for the center vis-à-vis his/her total working hours.

	Name	Age	Current affiliation (position title, organization, department)	Academic degree and current specialties	Effort(%)*	Notes (Enter "new" or "ongoing")
8	Stavros Katsanevas	68	Professor, Université Paris Denis Diderot Director, European Gravitational Observatory	Ph.D. Astroparticle Physics	10	ongoing
9	Masahiro Kawasaki	61	Professor ICRR, The Univ. of Tokyo	Ph.D. Theoretical Physics (Cosmology)	40	ongoing
10	Young-Kee Kim	59	Louis Block Distinguished Service Professor Dept. of Physics, University of Chicago	Ph.D. Physics	10	ongoing
11	Toshiyuki Kobayashi	59	Professor Graduate School of Mathematical Sciences, The Univ. of Tokyo	Ph.D. Mathematics	30	ongoing
12	Toshitake Kohno	66	Professor School of Interdisciplinary Mathematical Sciences Meiji University	Ph.D. Mathematics	40	ongoing
13	Eiichiro Komatsu	47	Director Dept. of Physical Cosmology, Max Planck Institute for Astrophysics	Ph.D. Theoretical Physics (Cosmology)	20	ongoing
14	Kai Uwe Martens	58	Associate Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Experimental Neutrino Physics, Dark Matter Direct Detection	80	ongoing
15	Shigeki Matsumoto	49	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Theoretical Physics (Cosmology)	80	ongoing
16	Shigetaka Moriyama	52	Professor Kamioka Observatory, Institute for Cosmic Ray Research, The Univ. of Tokyo	Ph.D. Experimental Physics (Neutrino Physics)	20	ongoing

*Percentage of time that the principal investigator devotes to working for the center vis-à-vis his/her total working hours.

	Name	Age	Current affiliation (position title, organization, department)	Academic degree and current specialties	Effort(%)*	Notes (Enter "new" or "ongoing")
17	Hitoshi Murayama	58	MacAdams Professor of Physics and Center for Japanese Studies, University of California, Berkeley Professor, Principal investigator Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Particle theory, Cosmology	20	ongoing
18	Masayuki Nakahata	62	Professor Kamioka Observatory, Institute for Cosmic Ray Research, The Univ. of Tokyo	Ph.D. Astroparticle physics	40	ongoing
19	Hiraku Nakajima	60	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Mathematics	35	ongoing
20	Mihoko Nojiri	59	Professor Institute of Particle and Nuclear Studies , High Energy Accelerator Research Organization	Ph.D. Theoretical Physics (Particle Theory)	20	ongoing
21	Yasunori Nomura	48	Director, Berkeley Center for Theoretical Physics, Univ. of California, Berkeley Professor, Dept. of Physics, Univ. of California, Berkeley Senior Faculty Scientist, Physics Division, Lawrence Berkeley National Laboratory	Ph. D. Theoretical Physics (Particle Theory)	15	ongoing
22	David Spergel	61	Emeritus Professor Department of Astrophysical Sciences, Princeton University Director, Center for Computational Astrophysics, Flatiron Institute	Ph.D. Cosmology	40	ongoing
23	Naoshi Sugiyama	60	Vice President Director Professor Graduate School of Science Nagoya University	Ph.D. Cosmology	30	ongoing

*Percentage of time that the principal investigator devotes to working for the center vis-à-vis his/her total working hours.

	Name	Age	Current affiliation (position title, organization, department)	Academic degree and current specialties	Effort(%)*	Notes (Enter "new" or "ongoing")
24	Masahiro Takada	48	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Astronomy	80	ongoing
25	Tadayuki Takahashi	62	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Experimental Physics	80	ongoing
26	Yukinobu Toda	42	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. Mathematics	80	ongoing
27	Mark Robert Vagins	56	Professor Kavli IPMU, UTIAS, The Univ. of Tokyo	Ph.D. High Energy Physics	80	ongoing
28	Naoki Yoshida	48	Project Professor, PI Kavli IPMU, UTIAS, The Univ. of Tokyo Professor Department of Physics, The Univ. of Tokyo	Ph.D. Cosmology	40	ongoing

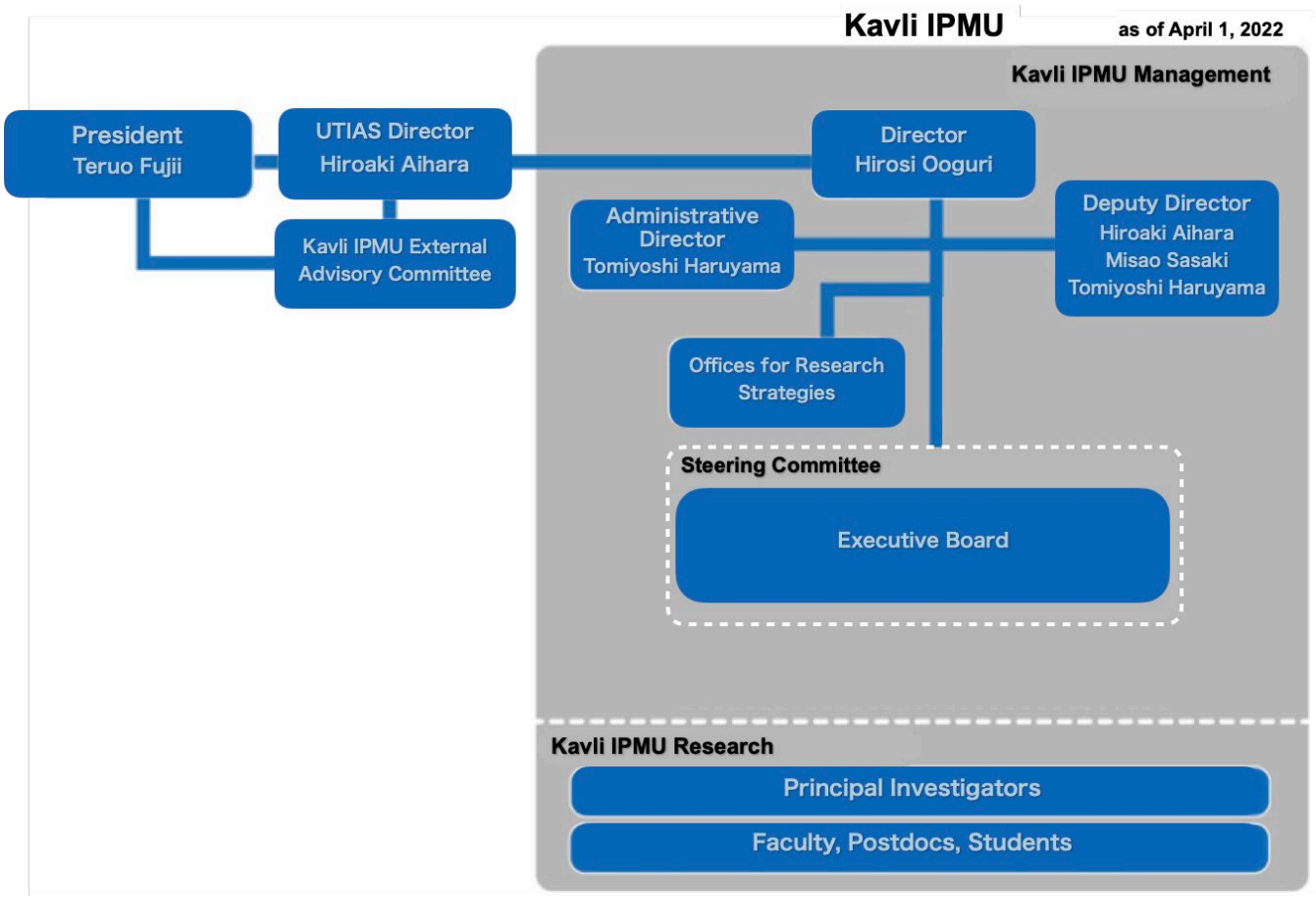
*Percentage of time that the principal investigator devotes to working for the center vis-à-vis his/her total working hours.

Number of Center Personnel

			FY2022	
			Number of persons	%
Researchers			220	
	Overseas researchers		113	51
	Female researchers		26	12
	Principal investigators (PIs)		28	
		Overseas PIs	7	25
		Female PIs	2	7
	Other researchers		142	
		Overseas researchers	71	50
		Female researchers	14	10
	Postdocs		50	
		Overseas Postdocs	35	70
		Female Postdocs	10	20
Research support staffs			27	
Administrative staffs			9	
TOTAL			256	

Appendix 2　Diagram of Center Management System

- Diagram management system after the funding period ends in an easily understood manner.
- If you are planning to change your organization management system and/or its position within the host institution in or after FY 2022 compared to their description in Appendix 3-1 of Activities report, show the changes in the diagram. Especially describe any important changes being planned in such as the center director, administrative director, head of host institution, and officer(s) in charge at the host institution (e.g., executive vice president for research).



Appendix 3 Position of the Center within Host Institution

* Diagram the Center's position within the organization of the host institution, and describe that positioning using excerpts from the institution's mid- to long-term plan. If the plan has not been established yet, describe the consideration being given to the Center's positioning.

In March 2021, UTIAS (University of Tokyo Institute for Advanced Studies) approved that the Kavli IPMU will keep stay in UTIAS as the qualified research organization. The new President T. Fujii is now preparing the institution's mid-to long-term plan which will match to the Fourth Mid-term Target which will start in April 2022 for another 6 years.