

Outline of Selected Project

Host institution	High Energy Accelerator Research Organization (KEK)
Center name	International Center for Quantum-field Measurement Systems for Studies of the Universe and Particles
Head of host institution	Masanori Yamauchi
Prospective Center director	Masashi Hazumi

<Project Summary>

Physics aims at an essential and unified understanding of the laws behind various physical phenomena ranging from particles to the universe. In physics, new research methods or means to establish the unification theory are highly evaluated, as clearly seen from the past research for which Nobel Prizes have been awarded. This center will return to the essence of physics and conduct interdisciplinary research on methodology by making maximum use of the research infrastructure resources of KEK, which is an international center of accelerators. In modern physics, a "quantum field" is the spacetime in which particles and quasiparticles are created and annihilated. Physicists have been exploring the fundamental equations governing quantum fields both theoretically and experimentally. "Quantum field measurement systems" in the name of this center is a new concept that has two meanings: one is to measure the quantum field, and the other is to measure "with" the quantum field (including various quasiparticles). This center focuses on quantum field measurement systems, which have been undergoing significant innovation in recent years. It aims to bring about innovative development through interdisciplinary research of particle physics, astrophysics, condensed matter physics, measurement science, and systems science. This means that humanity will gain new "eyes," so to speak. It will lead to applications in various academic fields beyond physics and their huge and high-level fusion. Furthermore, it will pave the way for implementation in the future society, as represented by smart cities.

<Remarks>

- The proposal has the possibility for making a major leap forward in scientific knowledge across many domains by a fusion of macro (cosmological), micro (sub-atomic) scale physics and systems science, and development of novel quantum measurement principles.
- The proposal embodies what is expected of a WPI center (path-breaking research, globalization etc...).
- The proposed director is a world-class researcher.