

新学術領域研究（研究領域提案型）の研究概要（英語版）

Exploration of Particle Physics and Cosmology with Neutrinos

<http://www.he.scphys.kyoto-u.ac.jp/nucosmos/>

Number of Research Area	: <u>6003</u>	Term of Project	: <u>FY2018-2022</u>
Head Investigator	: <u>Tsuyoshi NAKAYA</u>		
Research Institution	: <u>Kyoto University, Graduate School of Science, Professor</u>		

Neutrino physics aims to explain various phenomena including not only the basic properties of elementary particles, the origin of their masses, and the unification of the matter fields and forces but also to elucidate the origin of the matter-antimatter asymmetry of the universe as well as the universe's structure. This Innovative Research Area will advance research into neutrino oscillations, CP symmetry violation, and neutrino astronomy using world-leading neutrino experiments (Super-Kamiokande, T2K, and IceCube). Further, in order to explore grand unification and the early universe it will address even more fundamental questions with searches for proton decay, observations of the cosmic microwave background (Simons Array/Ground BIRD) to both measure neutrino masses and verify the inflationary model of the universe (primordial gravitational wave searches), and study the Majorana nature of neutrinos. Using neutrinos as its principle axis and combining research spanning particle and nuclear physics, cosmic ray physics, and cosmology, this Innovative Research Area seeks to establish a new picture of elementary particles and the universe for the 21st century.

This Innovative Research Area anticipates funding approximately two Invited Research Projects at a maximum grant of 3M JPY, approximately seven at a maximum of 2M JPY, and approximately 10 at a maximum of 1M JPY each fiscal year (one year). Research Group D01 is for research and development with neutrino experiments and the key technologies on which they are based (research related to Planned Research A01, A02, B01, or B02), D02 is for research related to observations of the natural world with neutrinos (research related to Planned Research A01, A03, or A04), and D03 is for theoretical research related to neutrinos (research related to Planned Research C01 or C02). Proposals for exploratory experimental or theoretical projects as well as interdisciplinary projects are welcome. Proposals spanning multiple Research Groups should choose the Group most closely related to the proposed research.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
D01 Experimental Neutrino Research (Including Detector R&D)	3	2
	2	3
	1	2
D02 Observations of Natural Sources Using Neutrinos (Earth, Cosmos, etc.)	2	2
	1	2
D03 Theoretical Neutrino Research	2	2
	1	6