Report of the RCNP Collaboration Research Network (RCNP-COREnet)

COREnet052 PI: Masaru Hongo

1	Title of research		Superfluid dynamics of nucleus and nuclear matter in the neutron star crust
2	List of Participants (Name and affiliation)		Masaru Hongo (Niigata University)
			Masayuki Matsuo (Niigata University)
			Kentaro Nishimura (Hiroshima University)
			Yuki Fujimoto (University of California, Berkeley)
			Keisuke Fujii (Institute of Science Tokyo)
3	Period of research		FY2024
4	Main location of collaboration implementation		Niigata University
5	Publication list (Please include DOI if available)	Articles	Yukinao Akamatsu, Shimpei Endo, Keisuke Fujii, Masaru Hongo "Complex-valued in-medium potential between heavy impurities in ultracold atoms" Phys. Rev. A 110, 033304 (2024).
		Talks	Masaru Hongo, "Hydrodynamics for symmetry broken phases", The XVIth Quark Confinement and the Hadron Spectrum Conference, 2024年8月
			Masaru Hongo, "Spin relaxation dynamics in hot QCD matter", West Lake Workshop on Nuclear Physics, 2024 2024年10月18日
			Masaru Hongo, "Hydrodynamics of superfluid phases in neutron star inner crusts", Hadrons and Hadron Interactions in QCD 2024, 2024年 10月 31日
			Masaru Hongo, "Relaxation dynamics of quasi-hydrodynamic mode", Holographic perspectives on chiral transport and spin dynamics, 2025年3月27日
6	Description of the results and outputs		In FY 2024, we have obtained the following results: - We derived the complex potential acting on an impurity placed in a medium of ultracold atomic gases (either a Fermi gas or a superfluid), and published a paper on the result. - We analyzed the equations of motion in superfluid hydrodynamics within the inner crust of neutron stars and gave an oral presentation on our preliminary result. - We formulated a hydrodynamic theory in the case of approximate symmetries and presented the results in invited talks.
7	Amount of budget implemented (for internal use only)		79,240 YEN