

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

COREnet043

PI: OTA Shinsuke

1	Title of research		Research on novel perspectives in nuclear superfluidity
2	List of Participants (Name and affiliation)		Shinsuke OTA (RCNP)
			Kenichi YOSHIDA (RCNP)
			Masahiro DOZONO (Kyoto University)
			Masayuki MATSUO (Niigata University)
			Susumu SHIMOURA (RCNP / RIKEN / CNS)
3	Period of research		FY2023 - FY2024
4	Main location of collaboration implementation		RCNP
5		Articles	K. Takahashi, Y. Matsuda, M. Matsuo, "Higgs response and pair condensation energy in superfluid nuclei", Prog. Theor. Exp. Phys., 2023 (2023) 083D01, https://doi.org/10.1093/ptep/ptad088
			K. Yoshida, "Proton-neutron pair correlations in neutron-rich nuclei", arXiv:2411.13963 [nucl-th], https://doi.org/10.48550/arXiv.2411.13963
	Publication list (Please include DOI if available)	Talks	K. Yoshida (Contribution) "Shell effects in the proton-neutron pairing" TOMOE Theory Workshop, Tohoku University, Sendai, Miyagi (6 - 10 January, 2025)
			S. Ota (invited), "Pair correlation and condensation via two-nucleon transfer reactions", The 3rd RIKEN RNC-CAS IMP Joint symposium, Nov. 07-08, 2024, RIKEN, Wako, Japan
			S. Ota (invited), "Recent activities on the study of nucleonic matter properties EoS and Pair condensation", JSPS/NRF/NSFC A3 Foresight Program "Nuclear Physics in the 21st Century" Joint Annual Meeting 2024, Jul. 19, 2024
			K. Yoshida (Invited) "Proton-neutron pairing in neutron-rich nuclei" Kyoto-Soongsil Nuclear Physics Joint Workshop (75th OMEG SSANP workshop), Soongsil University, Seoul, Korea (7 - 8 June, 2024)
			S. Ota (invited), "Experimental studies on the property of nucleonic matter from the nuclear scattering and pair transfer reactions", Advancing physics at next RIBF (ADRI2024), Jan. 23, 2024, RIKEN, Wako, Japan
6	Description of the results and outputs		Nuclear superfluidity is one of the essential properties of nucleon many-body systems such as atomic nuclei and neutron stars. The shape of the pair potentials is not well understood so far, although they are critical for understanding the superfluid properties. A new quantity to reveal them has been proposed by Matsuo and his colleagues: the pair polarizability. It is defined as an
7	Amount of budget implemented (for internal use only)		180466JPY