

Report of the RCNP Collaboration Research Network (RCNP-COREnet)				
COREnet050			PI: FUKUI Tokuro	
1	Title of research		Exploring Nuclear Giants: Structures and Reactions of Extremely Large Nuclei	
2	List of Participants (Name and affiliation)		Tokuro Fukui Assistant Professor, Faculty of Arts and Science, Kyushu University tokuro.fukui@artsci.kyushu-u.ac.jp	
			Shimpei Endo Associate Professor, Department of Engineering Science, The University of Electro-Communications shimpei.endo@uec.ac.jp	
			Junki Tanaka Assistant Professor, Research Center for Nuclear Physics, Osaka University junki@rcnp.osaka-u.ac.jp	
3	Period of research		July/2023–March/2025	
4	Main location of collaboration implementation		Research Center for Nuclear Physics, Osaka University	
5		Articles	"Efimov states in excited nuclear halos", S. Endo and J. Tanak, arXiv:2309.04131 (2023)	
		Talks	遠藤晋平, "Universality of resonantly interacting few--body systems", 九州大学 理論核物理研究会「現代核物理の広がり」と展望」、九州大学伊都キャンパス、2023年7月19日-21日 (口頭20日)	
			遠藤晋平, "Efimov physics in the sub-threshold excited nucle", RIBF Users Meeting 2023、理化学研究所(和光)、2023年9月6日-7日 (口頭7日)	
			遠藤晋平, "Exciting nuclei for the Efimov physics", クラスター領域研究会、理化学研究所(和光)、2023年9月22日-23日 (口頭22日)	
			Shimpei Endo, "Universality of Efimov states in cold atoms and nuclear physics", UEC-SAARC Symposium on Emerging Technologies (USSET)、UEC、2023年12月6日-7日 (口頭7日)	
			遠藤晋平, "Surprisingly large s-wave scattering length and Efimov states in the excited nuclei", RCNP Colloquium、大阪大学 核物理研究センター(RCNP)、2024年2月29日 (口頭)	
			遠藤晋平, 田中純貴, "原子核励起状態におけるエフィモフ状態", 日本物理学会春季大会、オンライン、2024年3月18日-21日 (口頭20日)	
			田中純貴, 遠藤晋平, "Giant scattering length fosters Efimov states in excited nuclear halo", 京都大学原子核理論研究室 核多体系セミナー 2023年12月15日(口頭)	
6	Description of the results and outputs		Universality in physics means different systems exhibit the same phenomenon, as seen in the Efimov effect, where multiple low-energy three-body bound states emerge with increasing sizes. We proposed a systematic method to identify nuclides with Efimov states near the neutron separation threshold. We identified 90Zr and 159Gd as novel candidate nuclides, suited for experimental realization.	
7	Amount of budget implemented (for internal use only)		¥160,344	

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