Report of the RCNP Collaboration Research Network (RCNP-COREnet)			
COREnet062			PI: Taiga Miyachi
1	Title of research		Shear viscosity in holographic QCD revisited
2	List of participants (Name; Position; Affiliation; E-mail)		Taiga Miyachi; postdoc; Osaka Central Advanced Mathematica Institute, Osaka Metropolitan University; tmiyachi@omu.ac.jp
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			Yukihiro Kanda; postdoc; Institute for Cosmic Ray Research, The University of Tokyo; kanday95@icrr.u-tokyo.ac.jp
3	Period of research		From 2025 FY to 2026 FY
4	Method and location of collaboration implementation (remote, or any place in case in person)		Zoom
5	Publication list (Please include DOI if available)	Articles	
		Talks	
6	Description of the results and outputs		This year, we initiated a study of the shear viscosity of the quark–gluon plasma (QGP) within a holographic framework using the exact WKB method to analyze quasinormal modes of gravitational waves. Analysis of scalar modes revealed that the method is not applicable in this case, consistent with previous studies, and we are currently investigating the reason while extending the approach to vector modes. We also resolved a key ambiguity in the choice of perturbative parameter in the WKB formulation and are developing a perturbative method to evaluate the phase integrals appearing in quasinormal mode conditions. In parallel, we explored holography based on non-supersymmetric string theory. Focusing on recent proposals regarding type 0B string theory, we identified an 8-form symmetry implying two types of 7-branes, which will be studied further to advance the holographic construction.
7	Amount of budget implemented and used		33,261YEN

8	Requests or comments for improvement of the COREnet program	To further advance this project, Dr. Yuma Furuta and Dr. Yukihiro Kanda, mentioned in list of participants, will be added as collaborators starting 2026 fiscal year. Their roles in this project and the necessity of their involvement are described below. Dr. Furuta is an expert in conformal field theory. His expertise in conformal field theory is particularly important for the string-theory side of the analysis in this research project. Conformal field theory plays two roles in string theory. First, string theory is itself defined using conformal field theory, because the excitation modes on the string are described by conformal field theory. This property plays a central role in controlling non-supersymmetric string theory. Second, the excitations on stable D3-branes are also described by conformal field theory. Since it is essential to study the properties of D3-branes in order to realize gauge theories such as QCD, we believe that the contribution of a conformal field theory expert like Dr. Furuta will be indispensable. Dr. Kanda is a researcher with expertise in calculating gravitational waves emitted by stringy objects spread out in (1+1) dimensions. By applying our research, which performs calculations of bulk gravitational waves using exact WKB, to gravitational waves emitted by stringy objects spread out in the bulk, it may be possible to calculate the viscosity of the “Spaghetti of Quarks with Glueballs phase,” which is expected to appear during the transition period of QGP formation. Following the viscous calculations for the QGP using Exact WKB, we plan to add viscous calculations using stringy object theory and proceed with the calculations in collaboration with Dr. Kanda, given that other applicants have limited experience with gravitational wave calculations using stringy object theory.