

Report of the RCNP Collaboration Research Network (RCNP-COREnet)		
COREnet039		PI: TANIGUCHI Yasutaka
1	Title of research	Microscopic evaluation of astrophysical nuclear reaction rates
2	List of Participants (Name and affiliation)	TANIGUCHI Yasutaka [National Institute of Technology (KOSEN), Kagawa College]
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3	Period of research	FY 2022-2023
4	Main location of collaboration implementation	RCNP (Toyonaka)
5	Publication list (Please include DOI if available)	Talks
6	Description of the results and outputs	This research was to analyze the inelastic scattering differential cross section to obtain information on decay channel components with tiny branching ratios. Specifically, the goal was to evaluate the $^{12}\text{C}+^{12}\text{C}$ channel components of resonances near the $^{12}\text{C}+^{12}\text{C}$ threshold for ^{24}Mg . This component plays a crucial role in the $^{12}\text{C}+^{12}\text{C}$ fusion reaction, the primary reaction of the carbon-burning process in astrophysical nuclear reactions. We calculated the inelastic scattering differential cross section using a microscopic reaction model with wave functions with the coupling of $^{12}\text{C}+^{12}\text{C}$ and exit channels $\alpha+^{20}\text{Ne}$ and $p+^{23}\text{Na}$ channels. For low-lying states, we reproduced the
7	Amount of budget implemented (for internal use only)	64,870