Report of RCNP International Joint Usage/Joint Research			
JOINT USAGE 008			PI: YOSHIDA Sei
1	Title of reserch		希釈冷凍機用極低バックグラウンド遮蔽材サンプルの微量放射能分析 Research of radioactivity measurement of ultra-low background shielding sample for dilution refrigerator
2	List of collaborators		大阪大学大学院理学研究科、氏名　吉田斉 東北大学ニュートリノ科学研究センター、氏名　石徹白晃治 大阪大学核物理研究センター、氏名　梅原さおり Sei Yoshida, Graduate schooll of Science, Osaka Univ. Koji Ishidoshiro, Research Center for Neutrino Science, Tohoku Univ. Saori Umehara, RCNP Osaka Univ.
3	Period of research		20日間 20 days with in FY2020
4	Main location of collaboration implementation		神岡二重ベータ崩壊実験室 Kamioka underground laboratory for double beta decay study
5	Publication list	Articles	
		Talks	・吉田斉,「極低温技術による 宇宙素粒子研究の高感度化; 吉田斉, 計画研究D02報告」,第七回極低放射能技術研究会, ONLINE, 2021年3月24-25日 ・(予定)石徹白晃治,　新学術領域「地下宇宙」2021年領域研究会, 神戸大学＋ONLINE（ハイブリッド）開催, 2021年5月19－21日
		Theses	
6	Description of the results and outputs		The CANDLES group is studying the double beta decay of Ca-48. We have been developing a calcium fluoride (CaF_2) scintillation detector. As a future plan, we are promoting research and development for the conversion of CaF2 scintillator into a scintirating bolometer. In addition to developing and evaluating the performance of scintillating bolometer detectors in the see level laboratory, preliminary measurement of radioactive background and noise evaluation of signals are indispensable in the underground environment. Therefore, we are planning to operate the dilution refrigerator(DR) in the Kamioka underground laboratory. The mechanical part of the DR contains a lot of radioactivity (mainly progenies of U238 and Th232 series), and it is essential to improve the passive shield between the mechanical part of the DR and the detector body in order to carry out highly sensitive development. Therefore, the addtional shield will be installed between the mixing chamber of DR and the detector body. We measured radioactive impurities (mainly U238 series, Th232 series nuclides, natural radioactive elements such as K40) contained in material samples (oxygen-free high conductivity (OFHC) copper, and its welded lines) for use as the additional shield. The following results were obtained. OFHC Cu [mBq/kg]; <4.7 (Ra226), 5.2\pm3.2 (Th232), <38 (K40), <2.0 (Cs137), <1.7 (Co60) Cu welding line [mBq/sample]; <2.4 (Ra226), <3.5 (Th232), <24 (K40), <0.8 (Cs137), <0.9 (Co60)