

1	Title of research	Neutron Electric Dipole Moment Search using Ultra-Cold Neutrons
2	List of Participants (Name and affiliation)	KEK RCNP University of Winnipeg TRIUMF
3	Period of research	May 1, 2020 – March 31, 2022
4	Main location of collaboration implementation	KEK
5	Publication list (Please include DOI if available)	<p>Articles</p> <p>"Optimizing neutron moderators for a spallation-driven ultracold-neutron source at TRIUMF" W. Schreyer, C. A. Davis, S. Kawasaki, T. Kikawa, C. Marshall, K. Mishima, T. Okamura, R. Picker Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 959, 163525 (2020) https://doi.org/10.1016/j.nima.2020.163525</p> <p>"Development of a Helium-3 Cryostat for Ultra-Cold Neutron Source". S. Kawasaki and T. Okamura, IOP Conference Series Materials Science and Engineering 755, 012140 (2020). https://doi.org/10.1088/1757-899X/755/1/012140</p> <p>川崎真介, and TUCAN collaboration, "中性子電気双極子モーメント探索による時間反転対称性の検証", 日本物理学会 2020年秋季大会、Web開催、2020年9月14日-17日</p> <p>樋口嵩, TUCAN collaboration, 中性子 EDM 実験のための磁場関連実験要素の開発 日本物理学会 2020年秋季大会、Web開催、2020年9月14日-17日</p> <p>今城想平, 関義親, and TUCAN collaboration, "中性子 EDM 実験に使用する中性子輸送ガイド管の性能評価", 日本物理学会 2020年秋季大会、Web開催、2020年9月14日-17日</p> <p>S. Kawasaki, the TUCAN collaboration, "Development of a Helium-3 Cryostat for the TRIUMF Ultra-Cold Advanced", International Workshop on Searches for a Neutron Electric Dipole Moment (nEDM2021), Les Houches School of Physics, France, 14-19 February, 2021.</p> <p>Takashi Higuchi, the TUCAN collaboration, "Prospects towards a neutron EDM measurement with an advanced ultracold neutron source at TRIUMF" International Workshop on Searches for a Neutron Electric Dipole Moment (nEDM2021) Les Houches School of Physics, France, 14-19 February, 2021.</p> <p>S. Imajo, "Performance measurement of ultracold neutron guides at J-PARC for a neutron EDM experiment in TRIUMF", International Workshop on Searches for a Neutron Electric Dipole Moment (nEDM2021) Les Houches School of Physics, France, 14-19 February, 2021.</p> <p>川崎真介, "大強度超冷中性子源による 中性子電気双極子モーメント探索", 日本物理学会第 76 回年次大会、東京大学 (オンライン)、2021年3月12日-15日</p> <p>樋口嵩, TUCAN collaboration TRIUMF における中性子 EDM 測定のための磁場関連実験要素の開発状況 日本物理学会第 76 回年次大会 2021年3月12日</p> <p>今城想平, TUCAN collaboration, "TRIUMF での中性子 EDM 実験に向けた J-PARC/MLF BL05 での中性子ガイド管の性能測定", 日本物理学会第 76 回年次大会、東京大学 (オンライン)、2021年3月12日-15日</p> <p>Theses</p>
6	Description of the results and outputs	<p>In view of the epidemic of covid-19, we did not make overseas business trips in FY2020. However, we have been managed our collaboration by holding weekly Japanese group meetings and international group meetings online.</p> <p>On a domestic business trip, we conducted the commissioning of a helium-3 cryostat, which is used for the upgrade of the UCN source at TRIUMF, at KEK, and evaluate its performance. We discussed deeply in-person meeting.</p> <p>An Ambient Magnetic Compensation (AMC) system has been developed in Japan. The AMC is a pair of coils that compensates large ambient magnetic fields produced by the cyclotron magnet so that mu-metal used for a magnetic shield is not saturated. Through online discussion with the collaboration, we decided requirements for the AMC system and detailed design which accommodates the magnetic shield room has been started. We had an online collaboration meeting in January 2021. The current status of the development of every sub-system of the neutron EDM measurement was reported.</p>