日本学術振興会に紙媒体で提出する必要はありません。

様　式　Ｆ－７－１

科学研究費助成事業（学術研究助成基金助成金）実施状況報告書（研究実施状況報告書）（令和元年度）

機関番号	１４６０３

所属研究機関名称		奈良先端科学技術大学院大学
研究代表者	部局	先端科学技術研究科
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	氏名	張　元玉

１．研究種目名　若手研究　　２．課題番号　19K14983

３．研究課題名　5G時代におけるIoT無線通信の物理層セキュリテイに関する研究

４．補助事業期間　令和元年度～令和３年度

５．研究実績の概要

1. We have proposed a novel cooperative jamming scheme for mmWave ad hoc networks with direct transmissions. Secrecy transmission analysis and optimization were also conducted. This research can be readily extended to mmWave cellular networks. The results of this research demonstrate the great potentials of the features of the mmWave links in achieving the physical layer security. Through this research, we produced one journal paper, which is now under revision.
2. We have proposed two physical layer security-aware buffer-aided relaying schemes for two-hop microwave wireless networks, which lay the foundation for the research in mmWave network of the next year. This work produced one international conference paper and one journal paper.

６．キーワード

物理層セキュリテイ

７．現在までの進捗状況

区分　(1) 当初の計画以上に進展している。

理由

In the plan of the first year, we focused on the scenario with direct mmWave links. Three issues will be addressed including cooperative jamming design, secrecy transmission capacity (STC) analysis and system STC optimization. All the three issues were addressed.
In addition to the research planed in the first year, I have also finished part of the research in the second year, including relay selection design and security-delay trade-off. The reason for progressing more smoothly than initially planned is due to our solid research background in previous studies in two-hop wireless networks. Although the part of research finished for the second year is for microwave wave communications, the results will also serve as good starting points for the research in mmWave scenairos.

８．今後の研究の推進方策

In the FY2020, I will continue the research as follows.
1. Extend the buffer-aided relaying schemes, which were designed for conventional microwave cellular networks, to the partial cellular coverage scenario as planed in the grant proposal.
2. Investigate the physical layer security in hybrid networks, where microwave communications coexist with mmWave communications. Although this is beyond the scope of the grant proposal, it deserves a dedicated study and will facilitate the promotion of the research plan.

９．次年度使用が生じた理由と使用計画

Reason: I was planning to use up the money planned for this fiscal year. But due to the breakout of the corona virus, the conference was cancelled and I have to use the remaining money next fiscal year.

Usage Plan: I am planning to attend international/domestic conferences or visit some researchers for information collection. Besides, I also need to buy some computers for simulations and numerical calculations. I am also planning to hire some students to help me conduct simulations and numerical calculations.

１０．研究発表（令和元年度の研究成果）

〔雑誌論文〕　計1件（うち査読付論文　1件／うち国際共著　0件／うちオープンアクセス　0件）

１．著者名 Liao Xuening、Zhang Yuanyu、Wu Zhenqiang、Jiang Xiaohong	４．巻 98
２．論文標題 Buffer-aided relay selection for secure two-hop wireless networks with decode-and-forward relays and a diversity-combining eavesdropper	５．発行年 2020年
３．雑誌名 Ad Hoc Networks	６．最初と最後の頁 102039～102039
掲載論文のDOI（デジタルオブジェクト識別子） https://doi.org/10.1016/j.adhoc.2019.102039	査読の有無 有
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 －

〔学会発表〕　計1件（うち招待講演　0件／うち国際学会　1件）

１．発表者名 Xuening Liao, Yuanyu Zhang, Bo Liu and Zhenqiang Wu
２．発表標題 Secure Communication in Two-Hop Buffer-Aided Networks with Limited Packet Lifetime
３．学会等名 2019 International Conference on Networking and Network Applications (NaNA2019)（国際学会）
４．発表年 2019年

〔図書〕　計0件

１１．研究成果による産業財産権の出願・取得状況

計0件（うち出願0件／うち取得0件）

１２．科研費を使用して開催した国際研究集会

計0件

１３．本研究に関連して実施した国際共同研究の実施状況

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１４．備考

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