AGREEMENT
on Cooperation between
Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia, V.G. Mokerov Institute of Ultra High Frequency Semiconductor Electronics of the Russian Academy of Sciences, Moscow, Russia, and Research Institute of Electrical Communication, Tohoku University, Sendai, Japan

Prokhorov General Physics Institute of the Russian Academy of Sciences (GPI RAS), Moscow, Russia, V.G. Mokerov Institute of Ultra High Frequency Semiconductor Electronics of the Russian Academy of Sciences (IU-HFSE RAS), Moscow, Russia, and the Research Institute of Electrical Communication (RIEC), Tohoku University, Sendai, Japan agree on a long-term cooperation in their scientific research work, with particular reference to the development of highly-efficient emitters and detectors of terahertz waves relying on novel materials and physical principles.

For this purpose, it is planned to conduct theoretical, numerical and experimental studies of:

– innovative photoconductive materials, including heterostructures featuring new functional lattice-matched and strain-induced layers, aimed at the enhancement of optical-to-terahertz conversion efficiency in photoconductive antennas;

– novel electrode geometries for photoconductive antennas based on the principles of sub-wavelength light confinement at the shadow side of plasmonic and dielectric gratings and nanostructures, aimed at the enhancement of generation and detection of terahertz waves;

– multiplexing photoconductive antennas on a single chip, aimed at development of high-power terahertz emitters used for imaging applications;

– development of novel spectroscopic, sensing and imaging technologies based on the original terahertz emitters and detectors, as well as their applications in different branches of science and technology.

GPI RAS, IUHFSE RAS, and RIEC will conduct joint work on studies in the considered areas of applied physics, terahertz science and technology, and semiconductor science and technology using technological, experimental and computational facilities of all three sides.

Joint scientific experiments may involve exchange of scientific personnel for conducting joint work at the afore-mentioned institutes. Particularly, the following principal investigators may participate experiments, data analysis, workshops and discussions in terms of the considered cooperation:

– Prof. Taiichi Otsuji, Dr. Akira Satou, Dr. Takayuki Watanabe (all from RIEC);
– Prof. Victor Ryzhii, Dr. Dmitry Ponomarev, PhD students Denis Lavrukhin, Igor Glinskiy (all from IUHFSE RAS);
– Dr. Kirill Zaytsev, Dr. Igor Spektor, Dr. Yurii Goncharov, PhD student Nikita Chernomyrdin (all from GPI RAS).

The cooperation will be carried out on a no-exchange-of-funds basis. The scientific results obtained from the joint work will be the property of that institute, at which technological or experimental basis these results were obtained.

GPI RAS, IUHFSE RAS, and RIEC are intended for scientific publication. These will either be joint publications or require the approval of the scientific partner. Such approval cannot be withheld unduly.

GPI RAS, IUHFSE RAS, and RIEC may, with a separate written agreement between the parties, set forth the provisions that are not in or different from this agreement, regarding the handling of results and the other conditions, in each research theme arising in the course of this cooperation. In this case, such provisions shall apply in preference to this agreement.

This agreement will become effective from the date of the signatures by the representatives of each institutes and valid for the initial period of five years. The agreement will be reviewed not less than six months prior to the

natural termination of the current agreement and may be extended or renewed in mutual accordance. At any time, the terms of this Agreement may be amended by mutual agreement in a written notice.

The agreement should be concluded in three original documents, each written in English language and being equally authentic.

Date: Sept. 25.2020	Date: May 18. 2020	Date: May 18, 2020
From GPI RAS Director	From IUHFSE RAS Director	From RIEC Director
Corr.–Member of RAS, Dr. Sci. Sergey V. Garnov	Dr. Sci. Sergey A. Gamkrelidze	Prof. Satoshi Shioiri