

The drift velocity of electrons in a weak electric field was also studied. The transport properties of electrons in InAs are compared with the semiconductors of group A^{III}B^V (Si, Ge, GaAs) to which it belongs. The analysis results show that InAs is a promising material for the creation of semiconductor devices.

Keywords: indium arsenide, drift mobility, scattering rate.

References

- [1] V. A. Moskaliuk, Physics of electron processes. Dynamic processes. Kyiv, Ukraine: Polytechnika, 2004. (In Ukrainian)
- [2] T. Saurova, D. Kuzmenko, “Research of impulse properties of indium phosphide”, BULLETIN OF KYIV POLYTECHNIC INSTITUTE. SERIES INSTRUMENT MAKING, no. 54(2), pp. 49-52, 2017, DOI: 10.20535/1970.54(2).2017.119530
- [3] T. Saurova, and D. Kuzmenko, “Research of the AlGaAs impulse properties”, *IEEE 38th International Conference on Electronics and Nanotechnology (ELNANO-2018)*, pp. 92–95, April 2018.

UDC 004(082)

TEN WIRELESS TECHNOLOGIES THAT WILL SHAPE THE FUTURE OF THE INFORMATION AND COMMUNICATION TECHNOLOGY MARKET

Vladislav Dubinets, Aleksandr Kornienko

*National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», Kyiv, Ukraine
E-mail: vidubinets@ukr.net*

Gartner analysts [1] named the top ten wireless technologies and trends that will drive innovation in areas such as robotics, drones, unmanned vehicles and medical equipment. Main characteristics of these trends are presented in abstract.

1. Wi-Fi. Until the end of 2024, this network technology will remain the main one both for use in simple communications (offices, homes), and for use in more complex projects - in radar equipment, as a component of a two-factor authentication system (multi-factor authentication, MFA).

2. 5G. The deployment of technology will take up to 5 years. In some cases, it can supplement Wi-Fi, as it is economical for high-speed data transmission at large facilities (ports and enterprises). Future versions of the 5G standard will improve the use of the technology in IoT and systems where a minimum data transfer delay is required. In the next ten years, 5G will not be able to cope with the exponential growth of data transfer. 6G can provide speeds up to 400 times faster than 5G.

3. V2X. This is the general name of the technology (vehicle to everything communications) between conventional and unmanned vehicles interacting with each other and with road infrastructure. Current and emerging V2X standards - IEEE 802.11p, IEEE 802.11bd, 3GPP LTE-V2X, 3GPP 5G NR-V2X, 3GPP 6G NR-V2X will be mandatory for all new cars. In addition, V2X will contribute to the development of new services related to road safety, navigation, etc. By 2022, this market will be valued at 1.2 billion USD [2].

4. LPWA networks. Low Power Wide Area technologies are designed for M2M (Machine-to-Machine) applications and have proven their energy efficiency when used in IoT. The corresponding modules for low-speed data transmission over the radio channel are economical and therefore can be used to create miniature, low-cost devices powered by batteries (sensors and trackers), to work without maintenance for a long time in inaccessible places.

5. Wireless sensor network. This technology is a distributed self-organizing network of many sensors and actuators, interconnected via a radio channel. Wireless sensor networks have the potential for use in various fields - from medical diagnostics to object recognition and interaction with smart home systems.

6. Wireless technology for high-precision positioning. IEEE 802.11az technology (a promising standard) will be able to track the location of an object or a person with an accuracy of 1 meter; the promoted Wi-Fi Alliance company is expected to be introduced in March 2021. In addition, such functionality should appear in new versions of 5G.

7. Millimeter wave technology. It can be used by WiFi and 5G systems for high-speed data transfer (for example, 4K and 8K-video) in a small radius.

8. Backscatter. Backscatter network technology can send very low power data. This feature makes the technology ideal for small network devices. The principle underlying the operation of such modules is very original: communication modules of a new type do not generate their own signal, but reflect the signal of the router. This technology allows the creation of sensors, chips and other miniature devices for the home (or for the human body) that do not consume energy at all and do not require recharging the batteries, will always be turned on and will always “communicate” with each other.

9. SCR. Software-controlled radio transfers most of the signal processing from chips to software, providing support for more frequencies and protocols. The popularity of SCR will grow with the advent of new protocols.

10. Wireless transmission of electricity over long distances. The first attempts by manufacturers to implement such technologies did not lead to the revolution they were counting on. In the future, the situation may change, and the market will be flooded with laptops, monitors and household appliances that receive energy without cables.

Keywords: wireless technologies, vehicle to everything communications, backscatter network technology, software-controlled radio.

References

- [1] <https://www.gartner.com/en>
- [2] <https://www.bloomberg.com/press-releases>