

**METHOD OF DATA TRANSMISSION OVER NETWORK
COMMUNICATION CHANNELS BASED ON THE USE OF CARRIER
FREQUENCIES OF LASER RADIATION**

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In today's world, information is one of the most valuable resources that requires constant attention and innovative approaches to its transmission and processing. Information transfer is a key process that ensures communication and interaction in various areas of human activity (effective management, cooperation, rapid response to environmental changes, etc.).

Well-known technologies such as: Internet, mobile communications, social networks, etc. have significantly changed the way we transfer information. They allow for instantaneous data transfer across the globe and provide high-quality access and the required exchange speed. Information technologies are changing the ways and methods of data (information) transmission, creating new channels and formats to increase both the amount of data transmitted and its speed. Therefore, in the context of the rapid development of information technology, methods of processing and transmitting information are becoming increasingly relevant.

Thus, the development of a method for data transmission over network communication channels based on the use of laser carrier frequencies is an urgent scientific task.

The paper analyzes the main methods of data transmission over network communication channels, both wired and wireless. It is established that due to the use of fiber-optic communication, it is possible to provide a high speed of data (information) transmission. The use of wireless communication makes it possible to form data transmission channels in areas with difficult geographical conditions (mountains, forests, gorges, rivers, marshlands, etc.), where laying fiber-optic highways is impossible (economically inexpedient). A method of data (information) transmission over wireless (optical) and cable (fiber-optic) network communication channels is proposed. A block diagram of a device for multichannel data transmission is developed. As a source, single-mode multifrequency laser radiation with synchronization of spurious modes of one laser is used. The method allows data (information) to be transmitted over long distances and, among other things, to solve the "last mile" problem. In this case, data is transmitted by modulating laser radiation with carrier frequencies (longitudinal modes).

References:

1. Коломійцев О.В., Третьяк В.Ф., Катунін А.М., Філіппенков О.В., Посохов В.В., Любченко О.В. Метод передачі даних у атмосферно-оптичній лінії зв'язку для технології остання миля. Moderní aspekty vědy: XLV. Díl mezinárodní kolektivní monografie / Mezinárodní Ekonomický Institut s.r.o.. Česká republika: Mezinárodní Ekonomický Institut s.r.o., 2024. str. 542. – <https://doi.org/10.52058/45-2024>.