METHOD OF REGISTRATION OF THE DIFFERENT TIMES OF OPTICAL SIGNALS IN MULTICHANNEL LASER SYSTEMS

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Direct conversion interferometers began to be used in experiments on measuring the mass velocity of matter with the advent of lasers, since laser radiation has sufficient spatial and temporal coherence for measurements. Initially, they were different variations of a two-beam interferometer [2, 3]. With the development of technologies, the improvement of photo recording systems and, in particular, telecommunications equipment, the PDV (Photonic Doppler Velocimeter) system has become widespread today [1, 4].

Synchronization of multichannel PDV complexes is an urgent task, since in order to study fast gas-dynamic processes it is necessary to record the change in the velocity of an object at different points on its surface, but due to the fact that the acceleration of the object under study is uneven, a problem arises associated with determining the initial time of surface motion. Initially, this problem was solved by synchronously supplying an electric pulse to start the recording complexes and to start the gas-dynamic process. But this solution does not take into account the difference in optical paths in different channels of the used complexes, which may occur during the laying of the fiber route from the experimental assembly to the equipment. At present, a method is used to determine the time difference of optical lines of multichannel complexes of the PDV type, the error of which can reach up to 100 ns. In this regard, a method for recording the time difference is proposed, allowing synchronization of multichannel complexes of the PDV type, due to probing fiber bays with a laser broadband pulse, which will increase the accuracy of the experimental results to 3 ns.

The aim of the work is to develop a method for binding different types of fiber-optic measuring laserheterodyne complexes to a single point in time. The proposed synchronization method consists of mixing laser pulses into the channel of the complex so that reference time marks are registered on the experimental oscillogram, which show the time of passage of the optical signal along the fiber line.

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