PDV measurements of time intervals

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Nowadays, laser interferometry is widely used to record fast processes. Laser interferometry complexes, currently existing at RFNC-VNIITF and configured as PDV (Photon Doppler Velocimetry) systems, operate at a radiation wavelength of 1550 nm [1] [2]. In some experiments on acquiring data on shock compressibility of materials using PDV system, it is required to determine absolute and relative times of the onset of the phenomenon under study in addition to velocity measurements. The report discusses the possibilities of using PDV systems to measure time intervals for fast processes. Measurement configurations are suggested to level down the complexity of setups and achieve sub nanosecond accuracy in time interval measurements. Error of such measurements are estimated, defined by the complexity of PDV measuring complexes setups and of a system to synchronize the complexes with launching equipment, and by the method of experimental oscillograms processing.

[1] Strand O T, Goosman D R, Martinez, C Whitworth T L and Kuhlow W W 2006 *A Novel System for High-Speed Velocimetry Using Heterodyne Techniques, Rev. Sci. Instrum.* 77

[2] Kuchko D P, Ralnikov M A and Poptsov A G 2025 *Doppler-1 multichannel PDV complex, Proceedings of the International Conference "Zababakhin Scientific Talks"*