## Main field of study: 011200 Physics

Area of specialization: Physical Optics and Lasers

Department of Optics

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Reviewer: Ph.D, docent Y. E. Skoblo

**Experimental study of "memory effect" in argon**

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The work is devoted to the study of “memory effect” in a long discharge tube at pulse breakdown. A long tube is such that its length is much larger than the radius. Similar tubes are often used in various practical applications. Interest in the study of “memory effect” in breakdown in systems of this type is caused by not only a practical use, but also by a lack of information about the breakdown mechanism.The studies were conducted in two tubes, 40 and 80 cm length at pressure from 1 to 5 Torr and at different rates of increase of the voltage applied to the electrodes. We used two different circuit of the discharge switching, one of which made it possible to obtain sufficiently sharp leading edge of the applied voltage pulse, and the second one produced a linearly increasing voltage.

For the sequence of pulse pairs the dependence of dynamic breakdown voltage versus time delay between the pulses within a pair was obtained. It has revealed the formation of a local maximum in the areas of 8-15 ms. In this region the waveless breakdown of the tube was found.

The dependence of the ionization wave velocity from dynamic breakdown voltage was studied. The average speed of the ionization wave increases with the breakdown potential.

Model calculations have been carried out, to make qualitative explain for the mechanisms of memory effect in argon breakdown.

Publications:

1. Y. Oleinik, Experimental study of electrical breakdown in a long discharge tube. // Science and Progress. Conference Abstracts, 2013, p. 75.