

4.2.15. AUTOMATIC SYSTEM FOR TESTING AND IDENTIFICATION OF DIAMOND

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Existing measuring devices of the control do not allow to automate process of identification of brilliants [1].

The problem of identification of brilliants was solved on the basis of means of technical sight and a robotics on the basis of decisions of firm National Instruments (NI). The complex of individual factors was taken into account: distribution of internal and external defects; geometrical parameters of a facet.

In experiments brilliants of 0.5 carat were used. The stones chosen for experimental researches had various defects (including graphite, color inclusions, cracks). For photo-registration digital camera Canon EOS 50D with objective CANON 50/1.4 EF USM in mode LiveView (fig. 1) was used.

The optical circuit of registration allowed to investigate distribution of internal defects (at small f'/D). For reception of the greater GRIP a series of pictures was processed. Further in the program local analysis Furier (PhotoAcute Studio, Registax) the resulting image with the expanded range was created.

Individual identification of a stone was carried out on its defects and including graphite. The script of virtual instrument (VI) was developed in program NI Vision Assistant 8.6 (fig. 2). Function Particle Analysis formed a file of results of the control.

In the circuit of the control the He-Ne laser, telescopic system, a diaphragm which were used for illumination of a controllable stone is used, is perpendicular its forward side. The light labels received thus were registered by digital chamber Canon EOS 50D.

Light labels on the screen of the leaving and reflected beams has allowed to determine a facet of a stone (fig. 3). Researches have shown an opportunity of creation on the basis of computer technologies of firm National Instruments of effective means of the control and identification of brilliants.

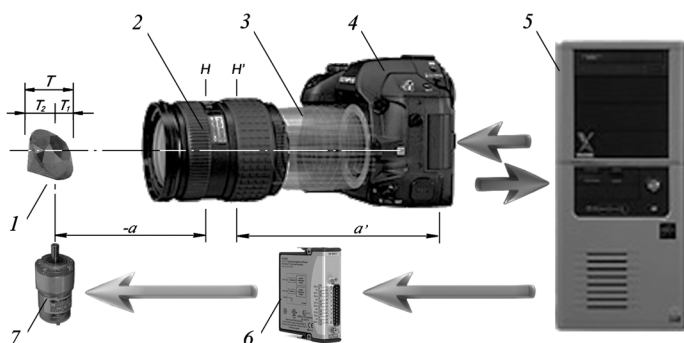


Fig. 1



Fig. 2

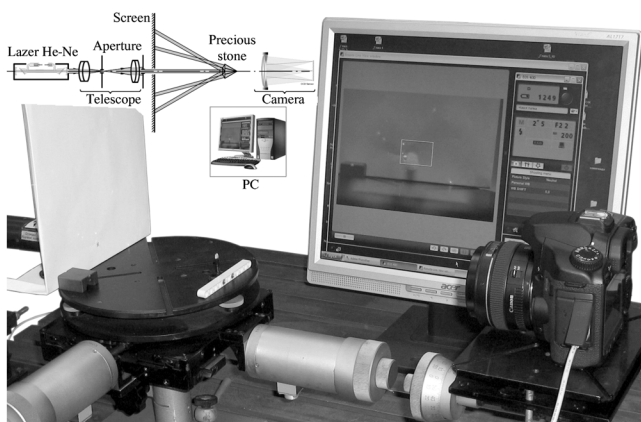


Fig. 3

References:

1. **Reinitz I.M., Johnson M.L., Hemphill T.S., Gilbertson A.M., Guerts R.H., Green B.D., Shigley J.E.** Modeling the Appearance of the Round Brilliant Cut Diamond: An Analysis of Fire, and More About Brilliance. *Gems&Gemology*, Vol. XXXVII, Fall 2001. – P. 174 – 197.