

SOME WAYS OF IMPROVEMENT THE ELECTROPHOTOMETRIC INSTRUMENTS

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ABSTRACT. In the paper some ways of the improvement (changes in the optical-mechanical part and improvement in the electronical part) the electrophotometric instruments are described. The apparatus which were constructed at Lviv astronomical observatory were taken as the examples.

Key words: electrophotometric observations; artificial celestial bodies (ACB)

The electrophotometric observations are the most popular method of getting information about stellar objects. Many years ago electrophotometric observations achieved popularity thanks to their simplicity and effectiveness of collection data. In spite of that at present there are no generally accepted type of instruments and methods for observations. It can be explained so that every experiment need special instrument and methodik. Especially it concerns the artificial celestial bodies (ACB). Besides that the aspiration to get information more accurate, in different spectral diapason, and from weaker and weaker ACB explains the wish to have better instruments. And that leads to modernisation and improvement of the electrophotometric apparatus.

For demonstration the ways of improvement the instruments one may take as the example the electrophotometers which were constructed at Lviv astronomical observatory. There were two ways of improvement: modernization of the optical-mechanical part and improvement of the electronical part.

One may begin the modernization of the optical-mechanical part with the prototype i.e. the electrophotometer with one objective without filters and without subtraction of the background. Than one constructs some examples of instruments which differ one from another in the number of objectives, spectral filters and as the consequence in the number of channels in which the ACB could be observed. There were constructed three examples of instrument:

first - with one objective and with automatical subtraction of sky background. As the result it has two channels for observations in integral light;

second - with two objectives, with different spectral

filters in each channel, and automatical subtraction of sky background. It means that this instrument has four channels;

the third - with four objectives, with three different filters, and automatical subtraction of sky background. It means eight channels for observations in three colors and integral light.

And so on: one can add some more objectives and get more channels. It is evidently that such way could be realised only for instruments with small objectives. But just such instruments are needed for the ACB which are very special object for observations. They have very fast velocity of motion on the sky and fast change of brightness.

The improvement of the electronical part concerns to all electrophotometric instrument not only to specialized for observations the ACB. And could be fulfilled in two directions: the improvement of the selection system and the improvement of the recording system. In the selection system one can researche good results if a mathematical model of inputing signal adequate to the experiment is chosen. Father on the base of this model one worked on the constructive algorithm of processing the signal and realised it in the specialised electronical scheme. It gave one the opportunity to make the most effective selection system with minimum errors.

In the registration system the improvement must go on the way of using the more accurate registration instrument. This way of improvement also concern to all the instruments. On the very beggining of the electrophotometric era all astronomers used the analog instruments (selfrecording apparatus), then - digital selfrecording instruments, and now - computers. Computer can be used in real time or with buffer. It depends on the main task of the observations. It is just the way we made during the improving the recording system. Our peculiarity is that we send the output signals of all channels of the electronical part of the electrophotometer to the computer in parallel regim. That gives us opportunity to save time and to make minimum errors during the registration the signal. In the future one would use still more powerfull computers and the question of improving would be in composing the better program service. And that we are doing now.