ABOUT AN OPPORTUNITY USAGE OF WATER BRAGG-CELL IN THE AOTFS BASED SPECTRAL COLORIMETER

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The precise color measurements are necessary in different sphere of activities as science and technique: at dye selection, for comparison of different industrial samples, when estimating color rendition in television and multimedia systems. Hence the need for precise, fast and cheap devices - spectral colorimeters.

In colorimetry two basic objective measurement methods are traditionally used: photoelectric and spectrometer. The spectral colorimeters have essential advantages and can potentially provide good metrological performance, produce chromaticity coefficients in any colorimetric system, however the serially produced now devices at present are complicated in construction, and require highly qualified personnel. The research and development into new methods and devices for color measurement is of great interest.

The use of the acousto-optical tunable filter in a spectral colorimeter results in construction and data processing algorithm peculiarities [1, 2]. The performance of AOTFs based spectral colorimeter greatly depend on an acousto-optical cell parameters and mode. In acousto-optical cells both crystalline substances and fluid can be applied as a working medium. Thus both collinear and non-collinear acousto-optical interaction modes are possible.

We consider water Bragg-cell as perspective for an AOTFs based spectral colorimeter is. The water has very high value of acousto-optical quality and is transparent in a spectral colorimeter wavelengths working range, at the same time intense sound attenuation restricts a higher acousto-optical cell frequency. In this case it is possible to implement the acousto-optical tunable filter with required resolving ability and diffraction efficiency, being small in dimension and inexpensive.

We obtained theoretical and experimental test results of the water based acousto-optical tunable filter for the colorimetry purposes.

References

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