

# **A METHODOLOGY BASED ON DIGITAL IMAGE PROCESSING TO CALCULATE THE VARIATION OF THE REFRACTIVE INDEX OF A MATERIAL IN CHROMATIC CONFOCAL MICROSCOPY**

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Chromatic Confocal Microscopy, as a member of the confocal microscopy family, has the property of depth discrimination. That means that the system discriminates against features which do not lie within the focal region of the lens. Additional to that important characteristic, Chromatic Confocal Microscopy has the special advantage of avoiding the axial movement of the specimen because in this technique a chromatic codification of the optical axis is made [1]. This characteristic is very convenient in order to carry out studies of multilayer materials and dispersion measurements [2,3].

This work shows a methodology based on digital image processing to calculate the variation of the refractive index of a material in chromatic confocal microscopy. This methodology has four principal parts. First, an axial scanning of the sample should be done. For each axial step a spectral data must be acquired and included as a row of a matrix. Then, this matrix is codified in several gray levels and called optical thickness matrix or OTM. So, the OTM is treated as an image and a segmentation process must be done. Two strips are segmented from the matrix and a skeletonization process is made afterwards. Finally, interpolation and a fitting process should be done in order to obtain the dispersion curve of the sample. The OTM has great perspectives because it could show a lot of visual information about the sample. Also, it is a new and original way of looking for information about characteristics related to the sample.

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