

EPI-POLARIZATION PART 3: MACRO OBSERVATIONS, PRODUCING EPI-POLARIZED LIGHT WITH A LAMP AND A FILTER.

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INTRODUCTION:

In the previous two articles in this series I discussed the production of epi-polarized illumination using a TV screen that is by itself a source of polarized light and with good results in the two applications I used it for.

The present article shows how to do epi-polarization but now with a common lamp and a bit of polarizing filter extracted from an old cellphone screen.

DEVELOPMENT:

For doing this experiment I covered the lamp of a smartphone with a bit of a polarizing filter obtained from an old cellphone screen, then I covered the camera of another smartphone with another bit of polarizing filter, after that I turn on the function lamp of the first phone and place it on a support that I made like this:



Then I placed some objects under the light beam and turned on the camera in the second cellphone to produce the effect. I manually rotate this cellphone until the field upon the object was dark. I used metallic objects.

The principal effect of darkening the field with polar filters was getting the metallic objects dark and revealing this way irregularities or additional objects upon it.

These are the objects originally:



A piece of a metallic screw holder and a Mexican ten peso coin.

These are the results when the field is dark:



Since it seems there is no advantage with this technique, I then covered the objects with birefringent materials such as transparent tape and a piece of acrylic from a compact disc box, getting in this way epi-polarizing illumination. This has the advantage of that in the case of the transparent tape it is flexible and adapts to the form of the object and this way it is possible to make an epi-polariscope for thick objects.

Results:



A screw holder with a bit of acrylic upon it.



A screw holder with a bit of transparent tape upon it with negative polar effect of the tape.



A screw holder with a bit of transparent tape upon it with positive polar effect of the tape.



A Mexican ten peso coin.

Conclusion:

As I have emphasized in the previous articles, the purpose of this series is first to explore the application of cross polar illumination using an upper illuminator and with this preparing the way to explore epi-illumination applied to microscopy and let me tell you that the results are promising.

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