

EPI-POLARIZATION PART 1: MACRO OBSERVATIONS, DIY EPI –POLARISCOPE WITH A TV SCREEN

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INTRODUCTION:

Last [April 2016](#) an article of mine about the topic of making a polariscope on a DIY basis was accepted for *Micscape*. It was defined then that the function of a polariscope is to show the birefringence of objects with anisotropic properties.

The condition for seeing the birefringence was to “sandwich” the object between a polarized source of light and a polarizing filter.

In the case of the polariscope I made, I was using an LCD display of a switched on laptop as a polarized source of light and a cellphone camera with a polarizing filter on the lenses to work as a polarizer and to rotate it as much as necessary to darken the field.

As the object was placed upon the source of light, that by definition is TRANSMITTED POLARIZATION.

But what if the source of light is above the object? Would we get good results?

Of course the results are beautiful and amazing. See below.

DEVELOPMENT:

While eating in the afternoons at home with the TV on, I noticed that if I placed on the table (which in the case of mine is a brown one, so it is a dark color) a piece of for example a transparent food container, it got refracted into colors. I know that that is birefringence but this time the object was not “sandwiched” between polarizing filters, it just was reflecting the polarized light of the LCD display of the TV above it, so by definition this is EPI-POLARIZATION.

Out of this we inferred that to do epi polarization FOUR conditions are necessary to be met:

FIRST CONDITION: A polarized source of light, I mean a source that by itself already emits polarized light, such as the TV screen, not a source of light with a filter on; not because that will also create epi-polarization but another piece of filter is needed to darken the field. I will show that possibility in a further article.

SECOND CONDITION: A birefringent object or one covered with a birefringent material.

THIRD CONDITION: A dark background, for this article I used a piece of black foam.

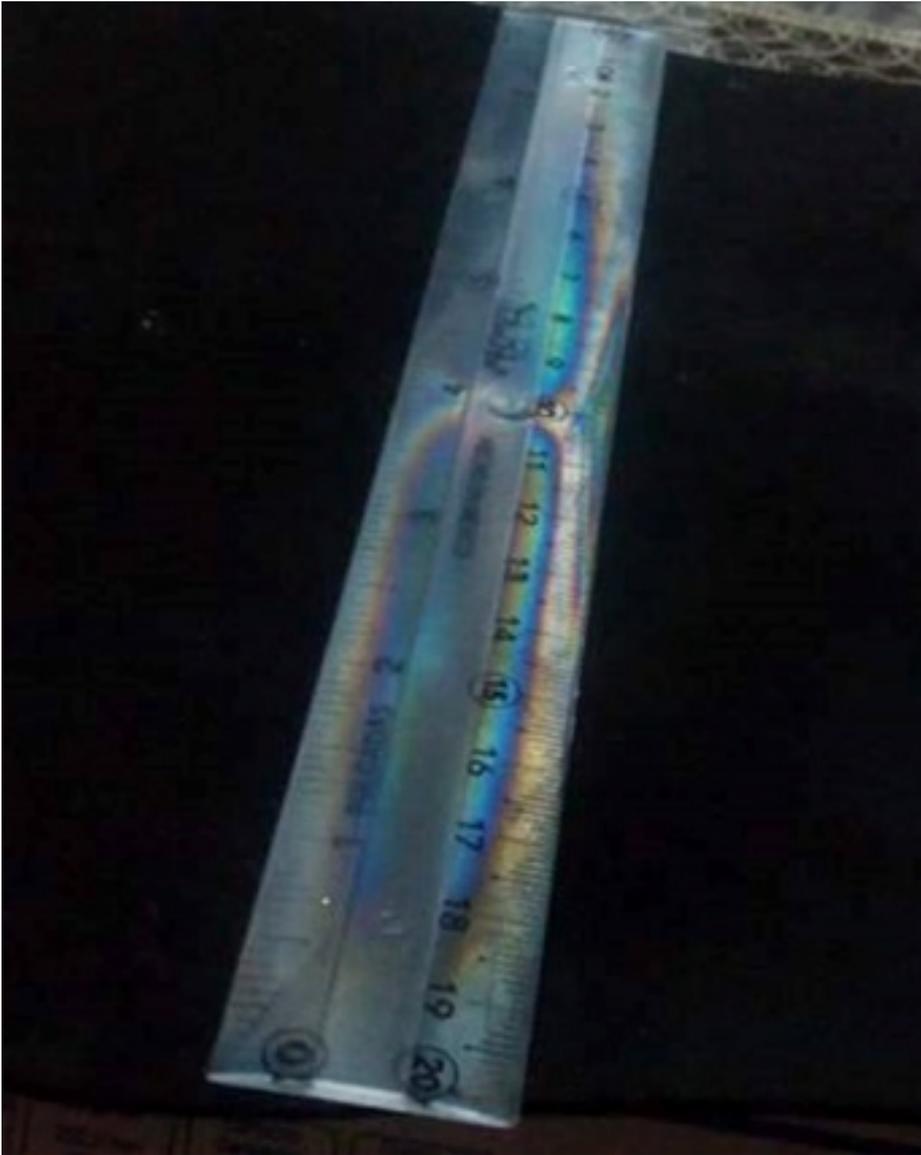
FOURTH CONDITION: The object should be plain or almost plain.

NOTE 1: the more intense the source of light, the better for getting nice results. For that reason, if possible open or set a white screen.

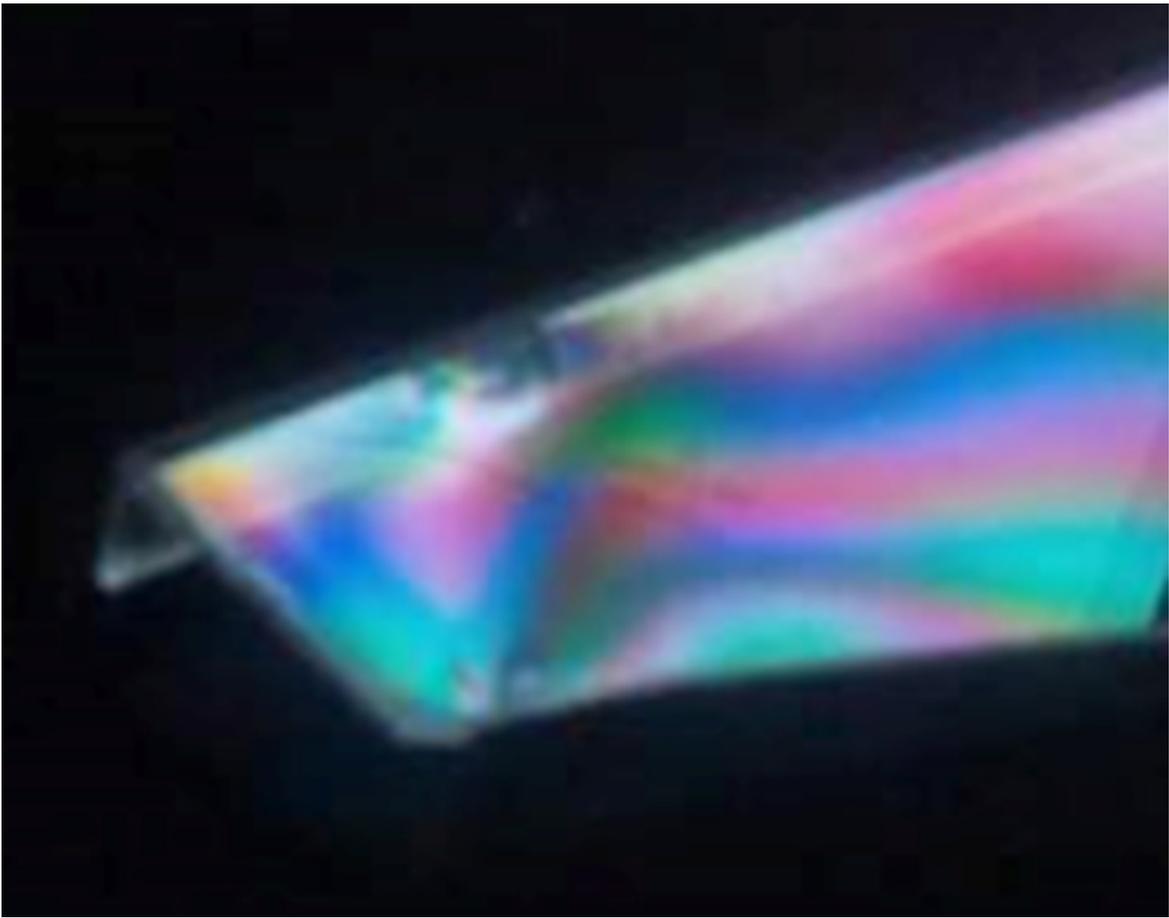
NOTE 2: because of the disposition of the observer regularly it is oblique by definition, although not necessary.

So just turn on the TV and place upon a dark surface a piece of birefringent material.

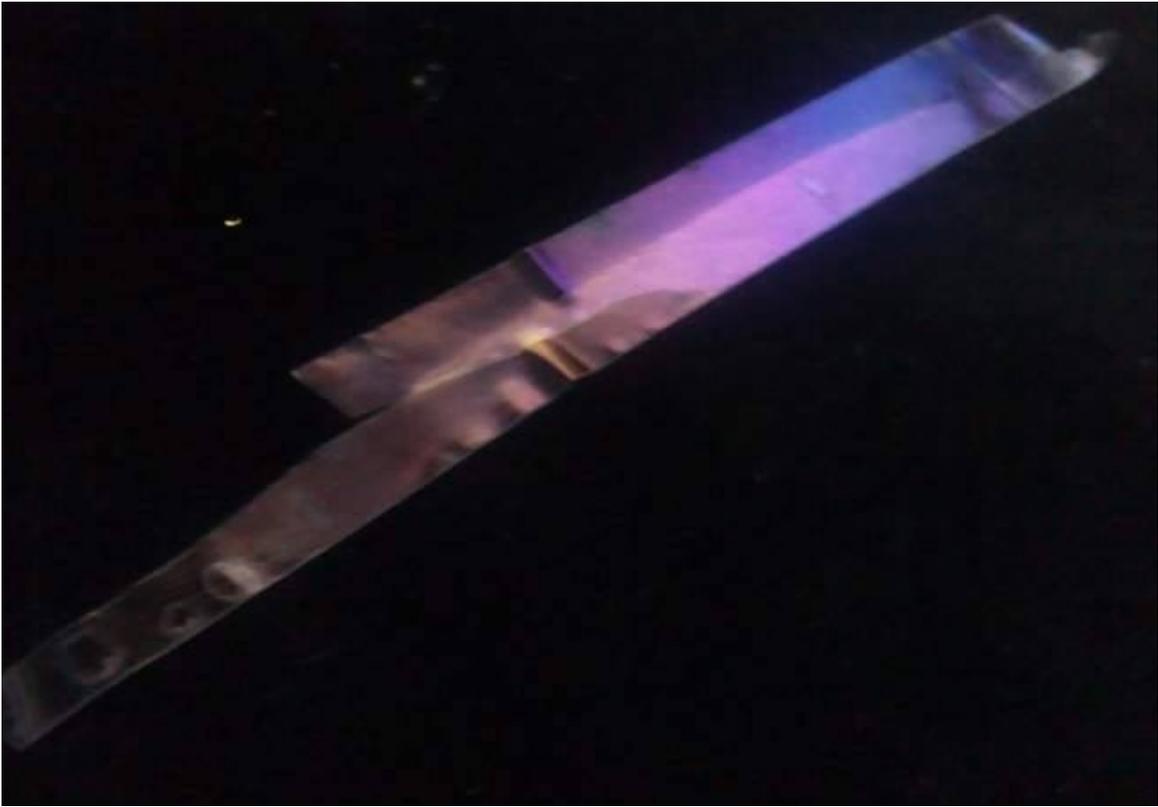
RESULTS:



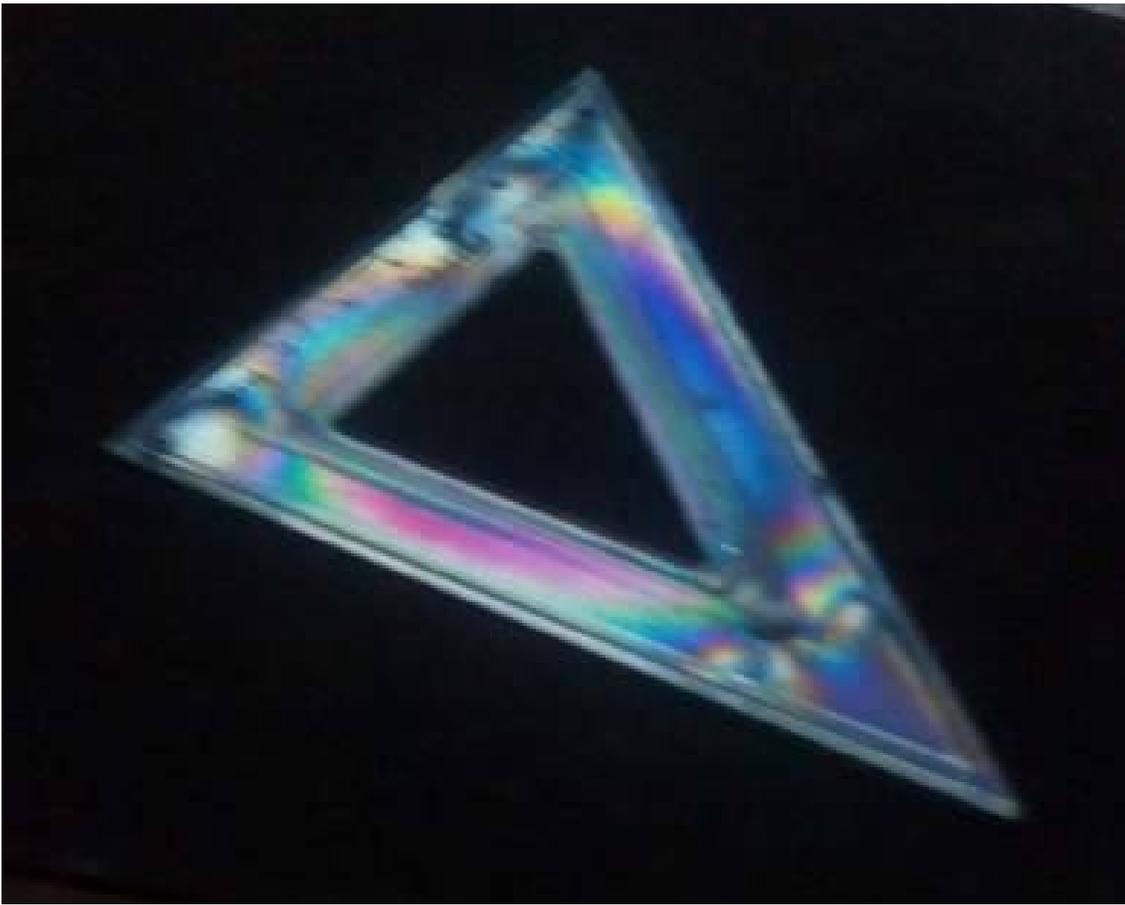
A 20 cm rule



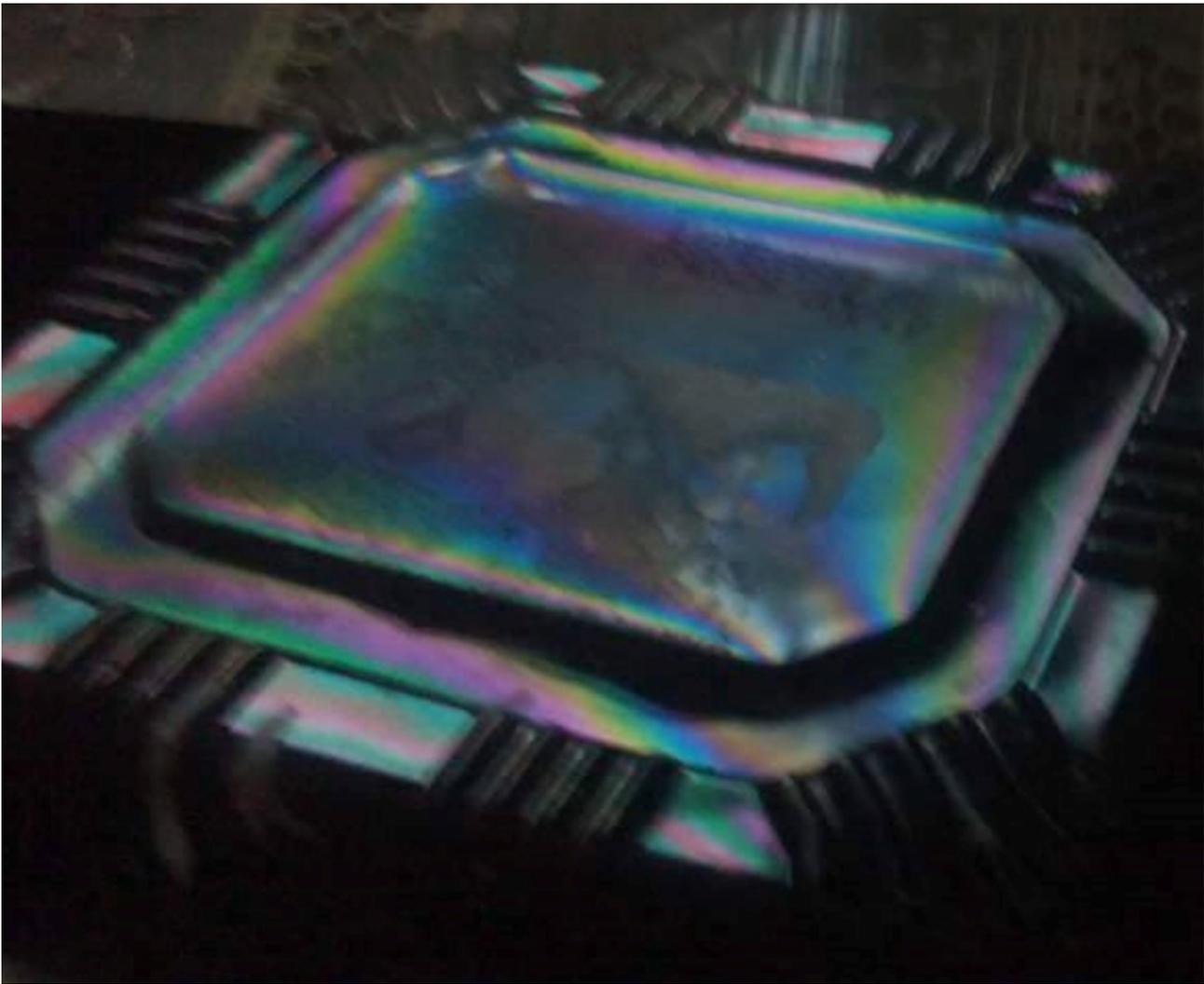
A bit of a compact disk box



Some transparent tape



A triangular rule



A cover of a disposable plastic container



A triangular rule and a bit of a plastic bag

CONCLUSION:

Two purposes are targeted with this experiment:

The first is to take advantage of this beautiful phenomenon that happens in front of us everyday and with a device as common as a TV set and with objects as ordinary as the ones used. Let me say that in a photo, it is not half as beautiful as in the real observation.

The second purpose and the main one for me, is to introduce the topic of DIY polarized microscopy, though let me tell you that I have two more experiments with macro observations related to this before going to microscopy which I have already gotten promising results in.

This would be another way of expanding epi-microscopy observations that I have been trying for some time, now with polarized light and with the privilege of doing it in a DIY basis.

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(Above in anti-spam format. Copy string to email software, remove spaces and manually insert the capitalised characters.)

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