

Metis polarimeter Bread Board characterization

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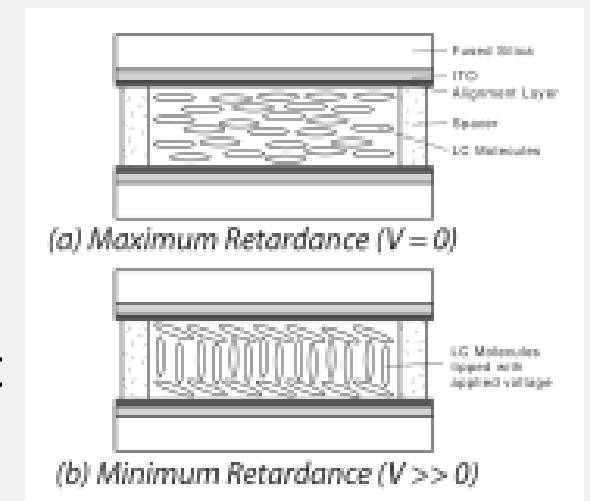
➤ Goal: To calibrate the Metis Polarization Modulation Package (PMP)



- The innovative visible light polarimeter of Metis includes two anti-parallel nematic Liquid-Crystal Variable Retarders (LCVRs).
- 2 Nematics LCVRs with parallel fast axis but molecules tilted in opposite directions

➤ Vantages:

- ✓ to avoid the mechanical components
- ✓ to avoid an increase in weight and in size





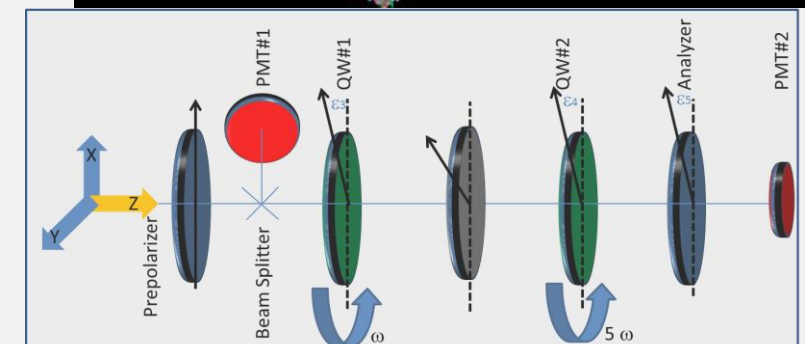
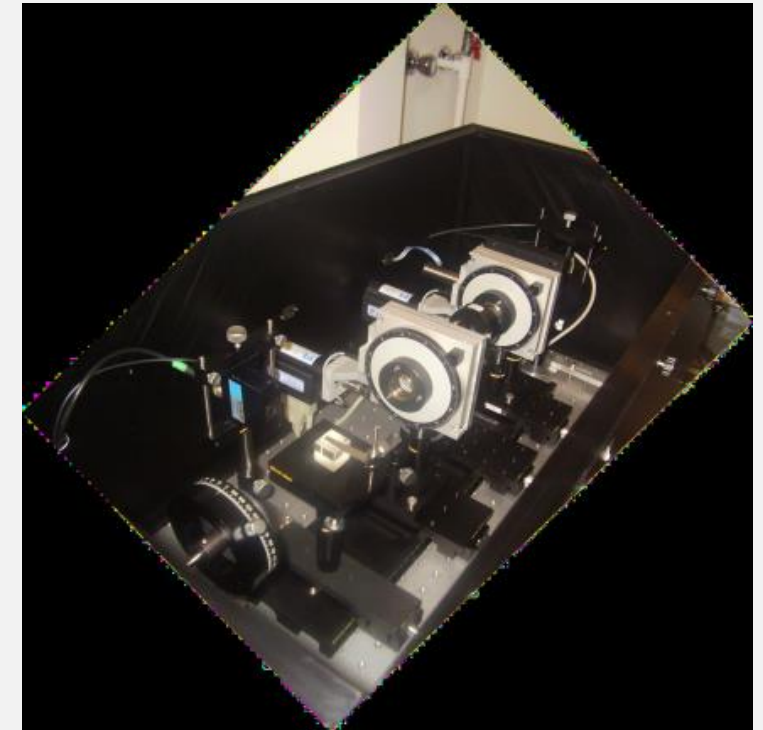
Experimental purpose

- To investigate the polarimetric characterization of the Bread Board of the METIS polarimeter it is necessary to retrieve:
 - Actual fast axis angle Cell#1
 - Retardance angle Cell#1
 - Actual fast axis angle Cell#2
 - Retardance angle Cell#2
- Retardance angles are dependant on:
 - Cell temperatures
 - Wavelength
 - Applied voltages

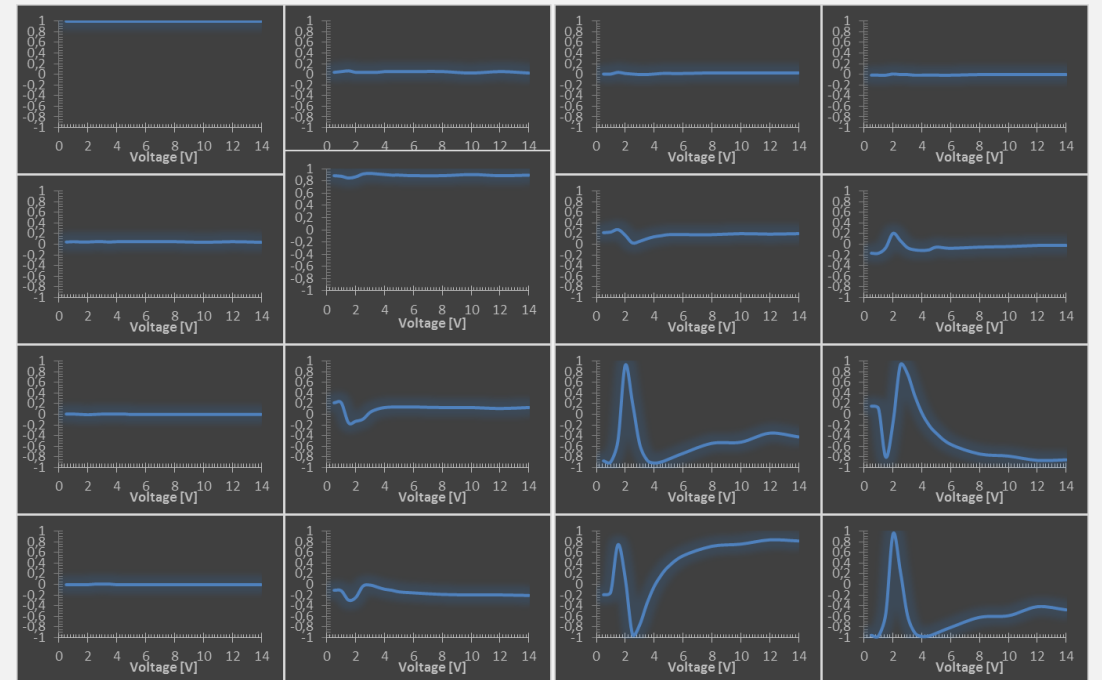
} Different conditions

Experimental setup

- The experimental setup is based on the Dual Rotating Retarder Polarimeter (DRRP) technique, originally proposed by Azzam (1978).
- This methodology is based on the encoding of the polarimetric properties of a sample in a signal modulated by two retarders placed before and after the sample, and rotating at 1:5 ratio.
- The result of this analysis is the Mueller matrix of the PMP. Which is dependent on the voltages applied to the cells, the wavelength and the temperature.



- Different case studies are taken into account → different Mueller matrices.
- It is possible to evaluate the actual fast axis and the retardance angle related to each cell by solving a system of four non-linear equations.





Conclusions

- Further measurements will take place in order to complete the polarimetric characterization of the Bread Board of the Metis coronagraph polarimeter.

THANK YOU