

## POLARIMETRIC OBSERVABLES FOR BIOLOGICAL TISSUES ENHANCED IMAGING

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Polarimetry is nowadays being used for enhanced visualization of biological or pathological tissues, as well as to train classification models for the automatic classification of structures (Gil et al., 2023; Ivanov et al., 2022; Rodríguez et al., 2023)[1,2]. In this work, we provide the suitability of two set of polarimetric observables, the Indices of Polarimetric Purity (IPP) and the Arrow derived observables, for the enhanced visualization of biological samples. Whereas the IPP focus on exploiting depolarizing properties of samples, Arrow derived observables also provide information of retardance or dichroic performance of samples. Thus, the combined used of these two sets of observables provides a complete polarimetric description of samples. In the current work, we provide some examples of polarimetric studies applied on diverse animal *ex-vivo* samples that allow to highlight the potential of such observables for the improved visualization of biological tissues. For instance, in Fig. 1 we observe a polarimetric treatment of an image of a coronal section of a cow brain that helps us to differentiate between different brain track orientation. For instance, OR in Fig. 1 describes optical radiations (longitudinal) and PCR parietal radiations of the corona radiata (transversal). Provided results pave the way for future studies in biomedical applications.

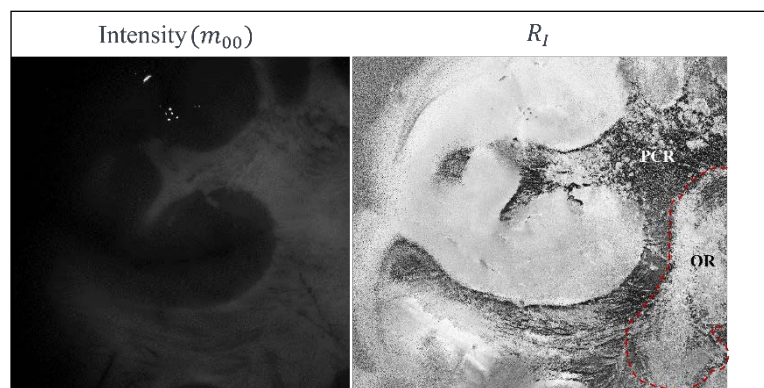


Fig. 1: Polarimetric based image for the discrimination of brain track directionality in a coronal section of a cow brain. (a) Intensity image; (b) Polarimetric image based on azimuth angle of the input retarded from Arrow decomposition.

- [1]. J.J Gil, I. San-José *et al*, *Photonics* **10**(6), 669 (2023).  
[2]. D. Ivanov, V. Dremin, *et al*, *Front. Phys.* **9** 814787(1-11) (2022).