

System and method for partial LCVR Stokes polarimeter thermal drift compensation

P. Terrier, J. M. Charbois, V. Devlaminck

Laboratoire LAGIS, Université Lille 1, 59655 Villeneuve d'Ascq, France

Abstract. In this paper we deal with the problem of thermal drift when using a LCVR (liquid crystal variable retarder) Stokes polarimeter. We address this problem in the restricted case of using a polarimeter to estimate partially linearly polarized light (that corresponds for example to the reflection of an unpolarized incident light on manufactured objects). Usually, the three parameters (S_0 , S_1 and S_2) are estimated by observing the reflected light wave, with a CCD sensor, through the LCVR polarimeter. The accuracy of the Stokes parameters estimate is then directly related to precise adjustment of the retardation. The problem is that the retardation introduced by a liquid crystal, variable retarder is strongly dependent on external factors (i.e. temperature). So, it is almost impossible to guarantee the reliability of the retardation in time and in practice it is either necessary to calibrate the LCVR just before carrying out measurement or use a thermostatic control. So, in this paper we propose a solution that does not care about the thermal drift of the LCVR to estimate accurately partially linearly polarized light without thermostatic control.