Optical Current Measurement System Using Faraday Crystal, Polarization-Maintaining Fiber and Faraday Rotator (Theory and Experiment)

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With advancing opto-electronic techniques, a current sensor consisting of a Faraday crystal has attracted great interest for measuring currents flowing at a high potential, such as in a UHV (ultra-high-voltage) transmission line, because the Faraday crystal is a kind of insulator having optical transparency for the laser beam. But there are some problems in system stabilization, for example: intensity fluctuations of the light source, the birefringence of optical elements and also optical strains in the longer fiber cable. Therefore, we have developed a new current measurement system associated with both azimuth angle modulation and P- and S-polarized light division methods.