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Simple and Accurate Experimental Method for Measuring Faraday Rotation

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SIMPLE AND ACCURATE EXPERIMENTAL METHOD FOR MEASURING FARADAY ROTATION

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High fidelity measurements of the magneto-optic phenomenon, Faraday rotation, have proven challenging in undergraduate laboratories. In this study, an extremely accurate experimental method of measurement, implementing an apparatus principally constructed of equipment accessible in a typical undergraduate laboratory, is described. In particular, the dispersion of the Verdet constant of water was measured at wavelengths ranging from 473 nm to 890 nm and found to agree with accepted literature values. The method addresses issues involving light detection in the context of polarization spectroscopy, implements digital signal processing for the purposes of data acquisition, and demonstrates the advantages of phase sensitive detection.