

Abstract Submitted
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Lock-In Based Technique for High Sensitivity Probe of Dielectric Modulation¹ JOSEPH TOLONE, Emory Henry College, YONG ZHANG², University of North Carolina at Charlotte — The purpose of this research is to develop a system that can detect weak, modulated signals. When taking measurements that are directly concerned with waves, interference and noise can become problematic. A lock-in amplifier is able to extract accurate information about the signal it is measuring and minimize the noise. By modulating incoming signals with an optical chopper, the lock-in amplifier is able to discriminate between modulated signal and unmodulated noise, and it can selectively amplify only the modulated signal. The development of a data acquisition system that uses a lock-in amplifier, optical chopper, laser/light source, and photo detector interfaced with a computer would improve the efficiency and effectiveness of optical-based measurements. In this research, I attempted to develop a data acquisition system using the format outlined above. At first, the system was synchronized with just the lock-in amplifier, optical chopper and photo detector. After testing and optimizing this system, a computer interface was added to try and provide more control and automation for future experiments. This modulation system will be applied to multiple areas of research and experimentation upon completion.

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