

**Master 2014**

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**Investigations on Digital Tunable Optical FP-Filter and Control using Multifunction I/O Device.**

***ABSTRACT - Masterthesis***

The Fabry-Perot Filter was discovered by Charles Fabry and Alfred Perot as a result of work which was conducted in the field of electricity and the necessity in this field for precise measurements of small distances. This device enabled high resolution observation of spectral features. The property distinguishing it from other spectroscopic devices is that, for a given resolving power, the Fabry-Perot is the most luminous instrument available. Because of the potential of precision associated with the techniques, these measurement techniques were rapidly deployed in laboratories across Europe.

The goal of this thesis is to investigate the tuning capabilities and scanning techniques of Fabry-Perot Filter and control it with the multifunction I/O Device USB 6009 from National Instruments. For this purpose, the broadband source that is realized by using an EDFA is connected to a Fabry-Perot Filter using a FC/APC connector. The Fabry-Perot Filter is controlled by USB 6009 through LabView programming by developing an algorithm for wavelength setting and implementation of a graphical user interface. Through this programming, the Fabry-Perot Filter is tuned to the desired wavelength. The output spectrum of the amplified and filtered output signal is observed through an Optical Spectrum Analyzer. The spectral filter characteristics like Free Spectral Range (FSR), Full Width at Half Maximum (FWHM) and Finesse (F) were investigated. The transmission behavior of the filter is observed through this set up and for the investigation of reflection behavior, Fiber Optic Coupler CNS 62600 is used.