

# **Design and Analysis of Transmission Optical Filter with Multi- FPR Structure for Dense Wavelength Division Multiplexing (DWDM) Communication System**

In this paper, it is demonstrated by means of simulations, the practical feasibility of a transmission filter implemented from a stack of high and low index birefringent thin films. Simulations were carried out with a software toolbox package implemented as Matlab™ m-files. The following materials were used (ZnSe, GaAs, BaF<sub>2</sub>) as coating materials and KB7 glass as substrate material. In this paper it can be study the designing of transmission filter with two, three or four Fabry-Perot resonators (FPRs) structure. The difference between each one of them show how the number of multi-stack layer belonging to each FPRs affect on the spectral properties of transmission filter and effect on the choosing of coating material on the properties of transmission filter. Results show that transmission filter of multi-FPRs results in narrowing the transmittance band and making it somewhat flatter at its top from the single one. But if it has multi-FPRs structure with equal length, the band becomes flatter than that of transmission filter with single FPR structure but exhibits some ripples. The difference between the values of refractive index of multi layer stack has great influence on the transmittance value, the spectral properties and number of peaks in the transmittance spectrum of the transmission filter as shown in the simulated figures.