

## ABSTRACT

Ring resonator is an integrated optic structure which consists of a round of optical fiber waveguide (ring waveguide) coupled with bus waveguide. One problem arises in using ring resonator, is that when optical fiber is installed and the polarization of the optical fiber's alignment doesn't match that will degrade the filter of single ring resonator's quality.

The solution this final project offered is by using PM (Polarization Maintaining) fiber. PMF is one of optical fiber type that has ability to maintain light's polarization. By using coupled mode theory in combination with transfer matrix method, the characteristic of ring resonator using PMF as the ring waveguide will be analyzed in this final project. The configuration of ring resonator that is analyzed is using two inputs, two outputs, one ring, and two couplers. The inspected parameters are the changes of ring's circumference ( $L$ ) and power coupling coefficient ( $\kappa$ ), considering PMF's parameters such as refractive index ( $n$ ), propagation constant ( $\beta$ ) and fiber loss ( $\alpha$ ). Simulation and analysis will be done by using Matlab R2010b.

The result in this final project is the best parameter of  $\kappa$  that is 0.1 and  $L$  that is 14.4cm at counterpropagate series configuration that has 60 MHz of FWHM, FSR is 138 MHz, and finesse is 23.06 which is best suit for optical filter

Keywords: single ring resonator, PMF (Polarization Maintaining Fiber), optical filter