Fully Integrated Optical Isolators

Sang-Yeob Sung, Xiaoyuan Qi, Samir Mondal, and Bethanie J.H. Stadler

Electrical and Computer Engineering

- Magneto-optical waveguides ($Y_3Fe_5O_{12}$) with smooth edges have been successfully grown on semiconductor substrates without thermal cracking.
- This is the first demonstration of integrated YIG waveguides with excellent optical properties on semiconductors.
- Birefringence, which inhibits Faraday rotation was substantially reduced by varying the waveguide’s cross-sectional shape and dimensions.
- A SmCo thin film permanent magnetic was deposited on top of yttrium-iron-garnet (YIG)/ MgO optical cladding layer to bias on magneto-optical layer.

Schematic and side view of integrated ridge waveguide optical isolator.