

T1300417 Extinction Ratio of Faraday Isolator vs input angle
6/29/10

Verdet Constant of TGG

$$\underline{V} := 1$$

Magnetic field of Faraday

$$B := 1$$

Length of TGG crystal

$$\underline{L} := 1$$

Phase rotation

$$\phi := V \cdot B \cdot L$$

input angle, rad

$$\theta_i := 0.001$$

length change due to input angle

$$\Delta_L(\theta_i) := L \cdot \left(\frac{1}{\cos(\theta_i)} - 1 \right)$$

relative length change with double pass

$$\frac{2 \cdot \Delta_L(\theta_i)}{L} = 1 \times 10^{-6}$$

phase rotation angle with double pass

$$\phi_F(\theta_i) := \frac{\pi}{2} \cdot \left(1 + \frac{2 \cdot \Delta_L(\theta_i)}{L} \right)$$

Transmissivity through crossed polarizer

$$\underline{T}(\theta_i) := \sin \left(\phi_F(\theta_i) - \frac{\pi}{2} \right)^2$$

$$T(.14) = 9.632 \times 10^{-4}$$

$$\theta_{id}(\theta_i) := \theta_i \cdot \frac{180}{\pi}$$

$$\theta_{id}(0.14) = 8.021$$

$\theta_i := 0, 0.001 \dots 0.2$

