고급광학 HW1

20182737 EE

이종건

1. Numerical estimate of nonlinear optical quantities, SHG

Calculate numerically the amplitude of the component of the nonlinear polarization oscillating at frequency .

Estimate numerically the amplitude of the dipole moment per atom oscillating at frequency .

Where,

Compare with linear response

1. Kerr effect
2. Silicon(Si)
3. Glass
4. Explain why XPM *n2* is twice larger than SPM *n2*, mathatically.

SPM:

XPM:

Ideally, . Therefore,

1. Determine the phase matching angle using type I

Negative Uniaxial Type I

1. Solve the coupled-amplitude equations and verify Eqs. (2.9.2)

Assume:

* The medium is lossless
* , arbitrary