Work Log

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Week 2 [9/1/2025-9/7/2025]

Tidy3D:

- Mesh Study (P/2, P/4, P/8, P/16, P/32, ...) on huygens metasurface and plot the transmission
- Understand how to calculate phase (Example)
- Learn how to use material library and define circular polarization (Example)
- Regenerate Figure 2B (Ultra narrowband geometric-phase resonant metasurfaces)

Nonlinear Optics:

Classes so far:

- Nonlinear susceptibility; anharmonic oscillator
- Properties of the nonlinear susceptibility; K - K relations 1.5 - 1.7

Week 1 [8/25/2025-8/31/2025]

- Tidy3D Huygen's metasurface simulation redo
- Read Fundamentals of Photonics Ch 1, 2, 6
- Read Boyd NLO Ch 1
- Tidy3D Python Tutorial 1 and 2

Tidy3D Learning Outline

FDTD 101:

1. Introduction to FDTD Simulation
2. Using FDTD to compute transmission spectrum
3. Mode Injection
4. Modeling Dispersive materials in FDTD
5. Introduction to PML
6. Timestep size and CFL conditions
7. Numerical Dispersion in FDTD
8. Dielectric constant assignment on Yee Grids
9. Subpixel Averaging

Tidy3D Python: