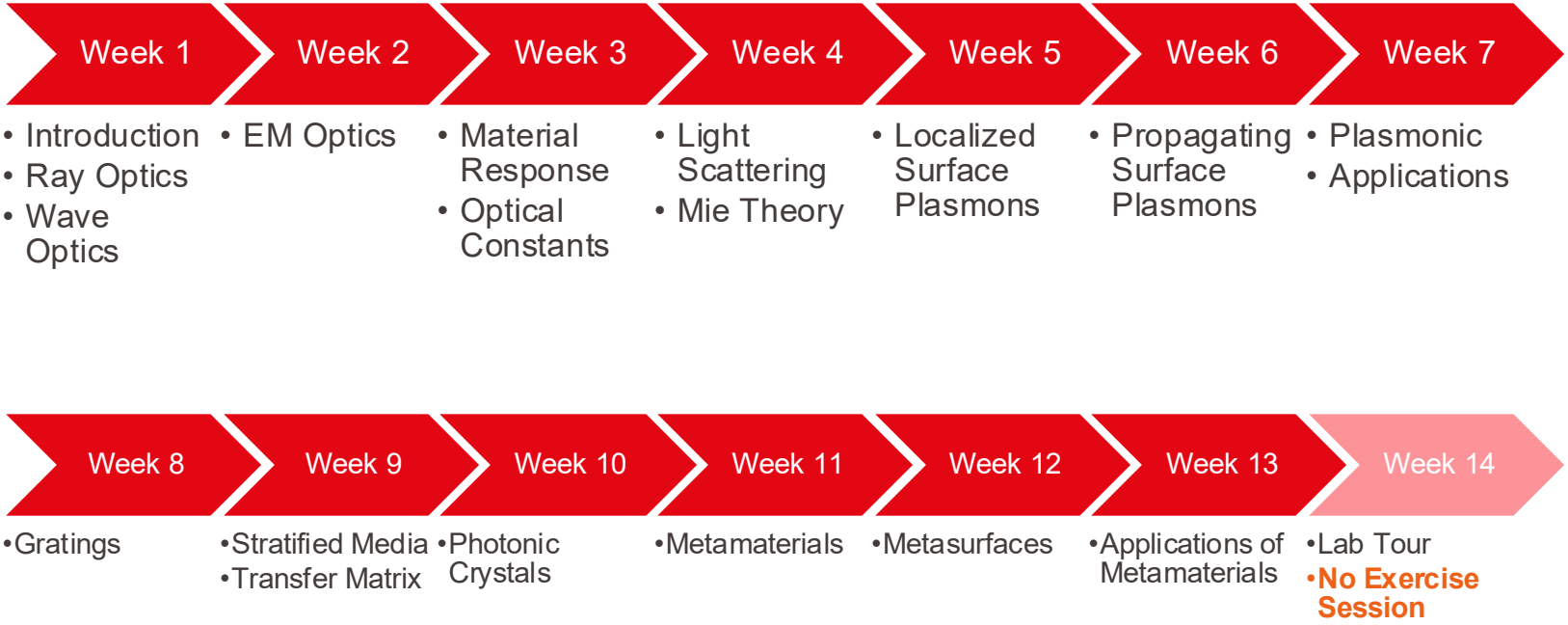
Week 13

(Applications of Metasurfaces)

Stavros Athanasiou

Lausanne, 09 Dec 2025

Course Timeline



Overview

:(This is is the final exercise session of the course for the Fall Semester 2025.

:) We would greatly appreciate your feedback about the exercises.

Stavros Athanasiou

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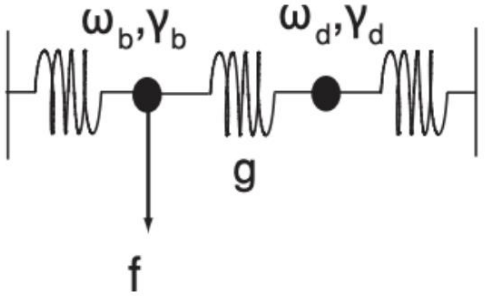
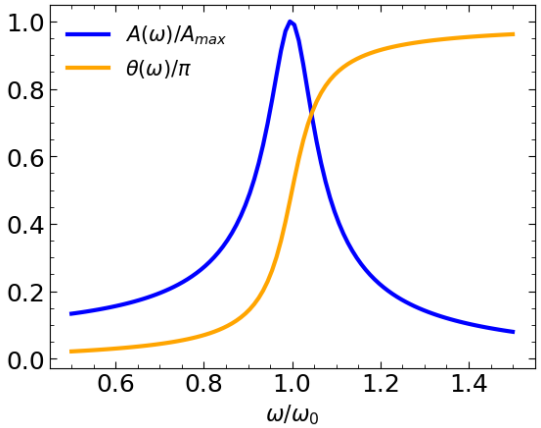
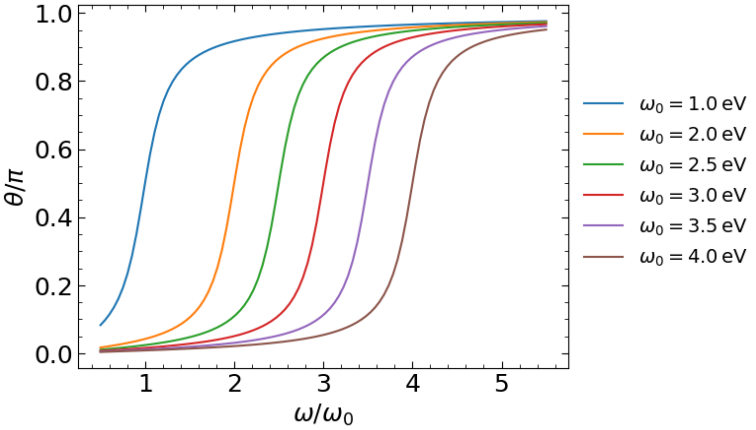
Last Week: Metasurfaces

1. A Damped Oscillator in an External Field
2. Studying Phase Shifts with Simple Oscillators
3. Mechanical Analogue of Fano Resonance







This Week: ~~Applications of Metasurfaces~~

Surface Plasmons Revisited

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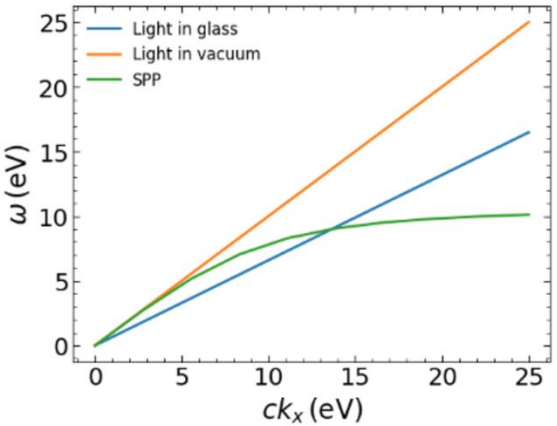
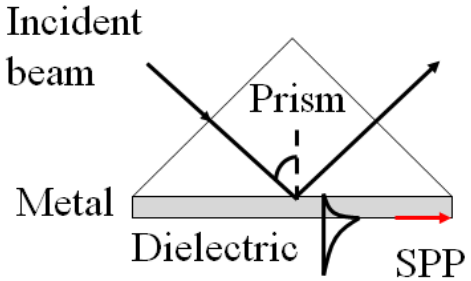
This Week: Surface Plasmons Revisited / 1

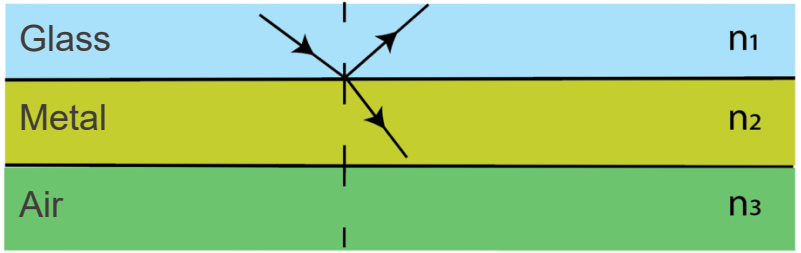
We go all the way back in Week 6, where we studied **Propagating Surface Plasmons**.



Plot adapted from Week 6.



Kretschmann Configuration



This Week: Surface Plasmons Revisited / 2

To tackle this problem, we use concepts from:

- **Week 2** : Electromagnetic Optics (Fresnel coefficients)
- **Week 6** : Propagating Surface Plasmons (Dispersion relations, Excitation of SPP)
- **Week 7** : Plasmonic Applications (Plasmonic sensing)
- **Week 9** : Stratified Media (Airy Formula)

This Week: Surface Plasmons Revisited / 3

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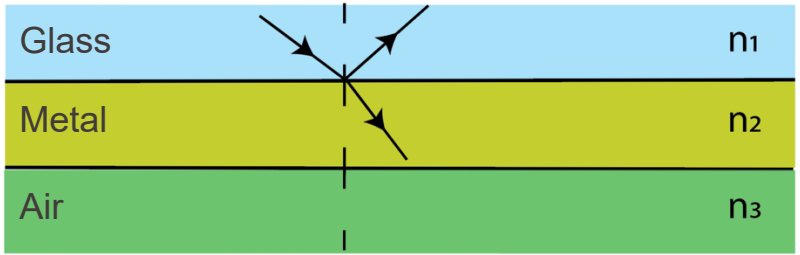
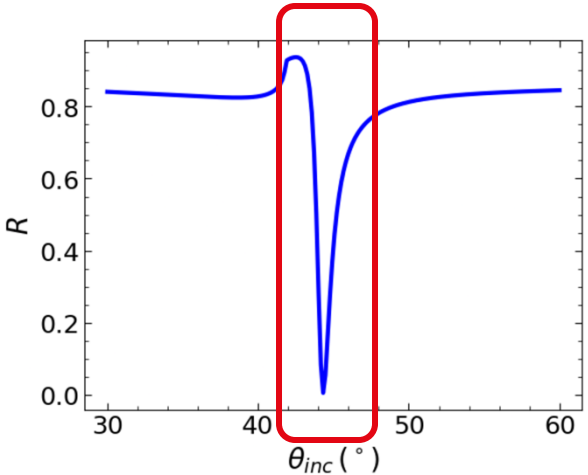
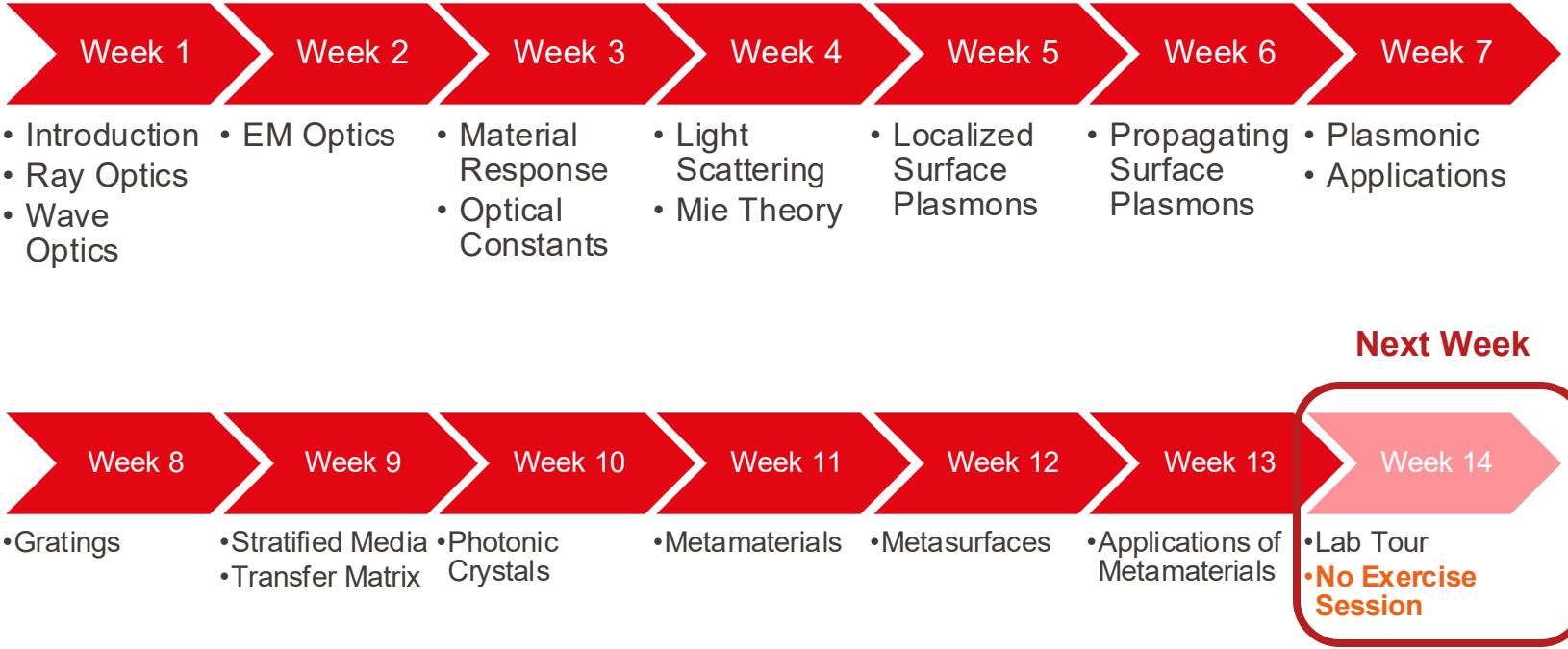
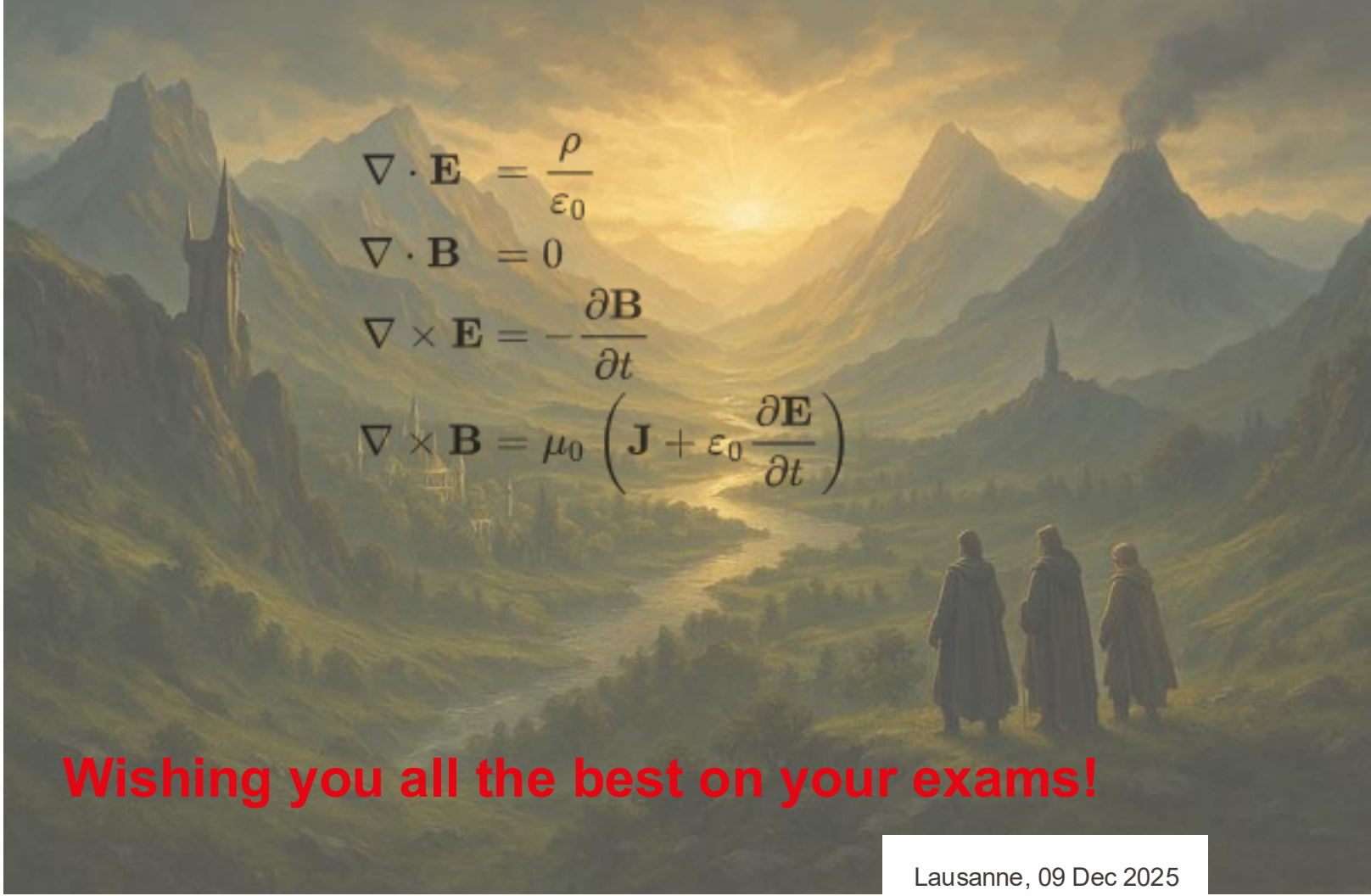
We illuminate the structure from the glass, and we compute the total reflectivity.





Course Timeline





Lausanne, 09 Dec 2025