Exercise 3.1-1

Class Exercises and Quick Questions to

3.1 Thin Films - General

Here are some class exercises and quick questions:

- Interference causes the color of a thin film and betrays its thickness? *Explain!*
- Give examples of what "thin" could mean in relation to *intrinsic* length scales. Provide (and discuss briefly) some intrinsic lengths, in particular with respect to semiconductors
- Give a few numbers for the meaning of "*thin*":
  - Thickness of a human hair ≈≈ **????**
  - Thickness of a gate oxide in an integrated transistor ≈≈ **????**
  - Thickness of antireflection layers of optical lenses ≈≈ **????**
  - Thickness of a thin film solar cell ≈≈ **????**
  - Other examples you can come up with **???**
- Give some examples of thin film applications *outside* of semiconductor technology.
- Give the equation for the capacity ***C*** of a parallel plate capacitor with plate area ***A*** for a maximum voltage of **10 V**. How can you achieve maximum capacity and what are the limits? Hint: Consider field strength and relvant intrinsic length scales.