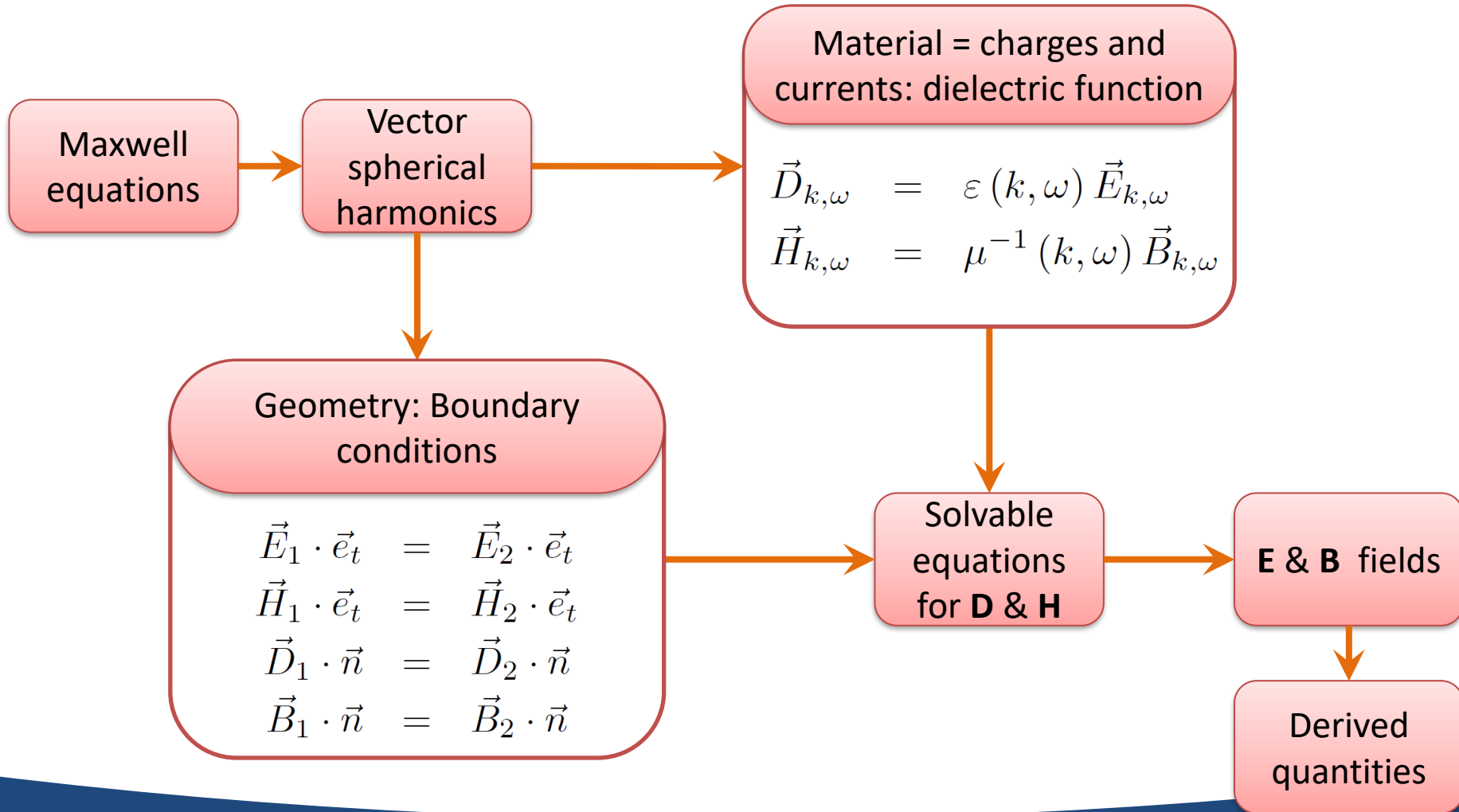




# Light scattering on a metallic sphere

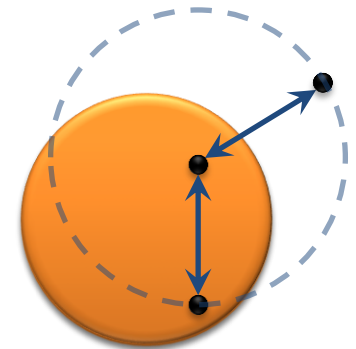
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NICK VAN DEN BROECK

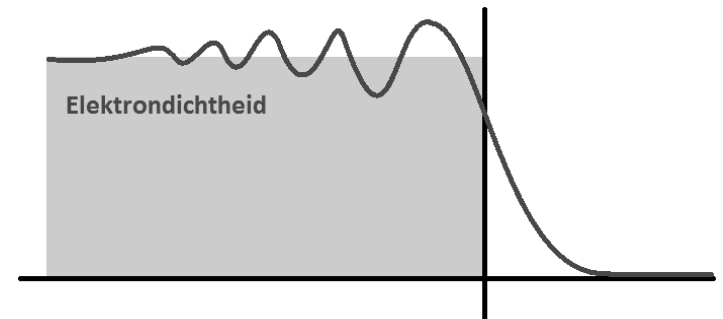


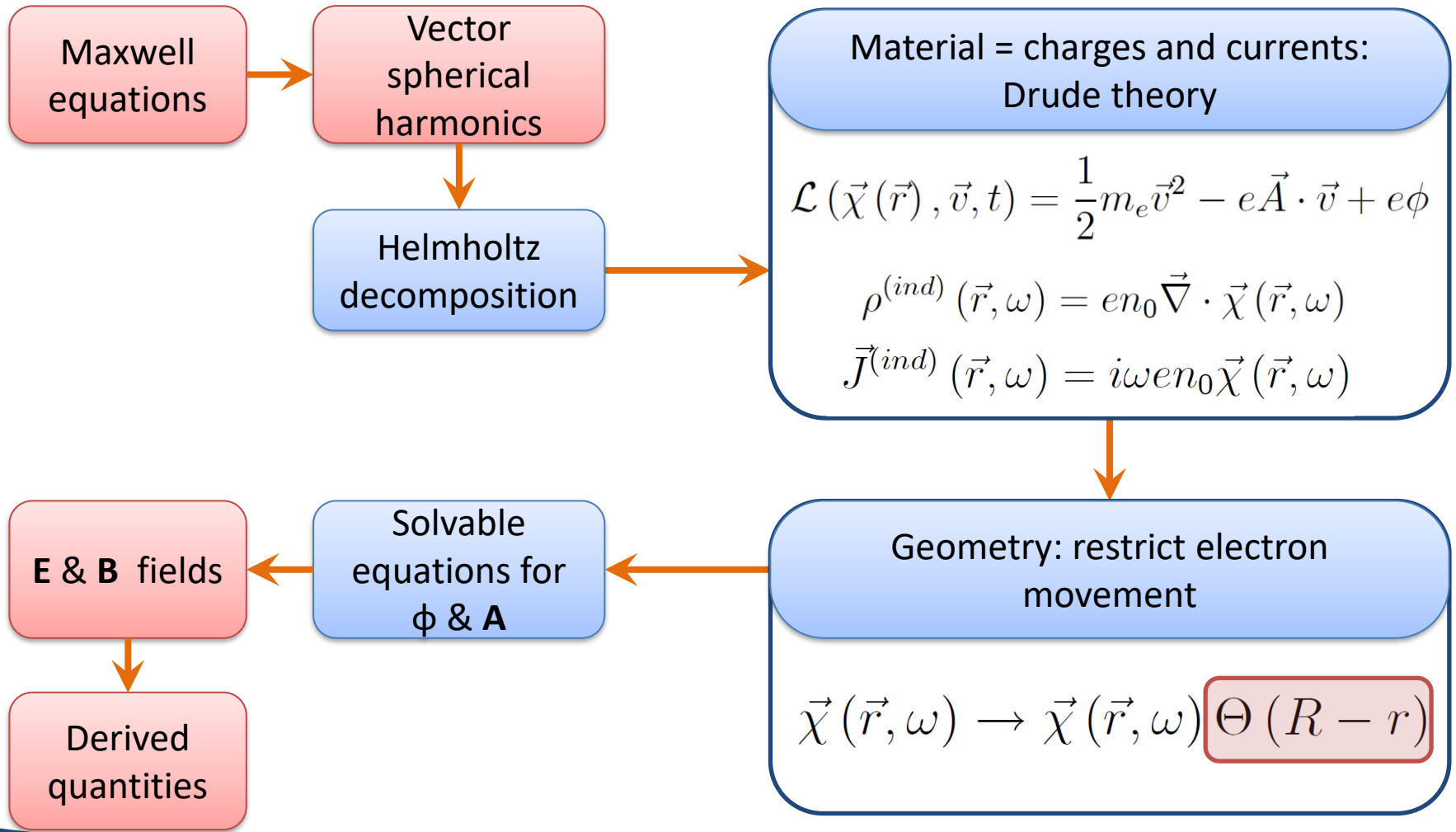
## Problems:

- Dielectric function is assumed to be homogeneous (only dependent on distances)
  - Ok for large structures, but not when surfaces become important
- No distinction between longitudinal and transversal waves



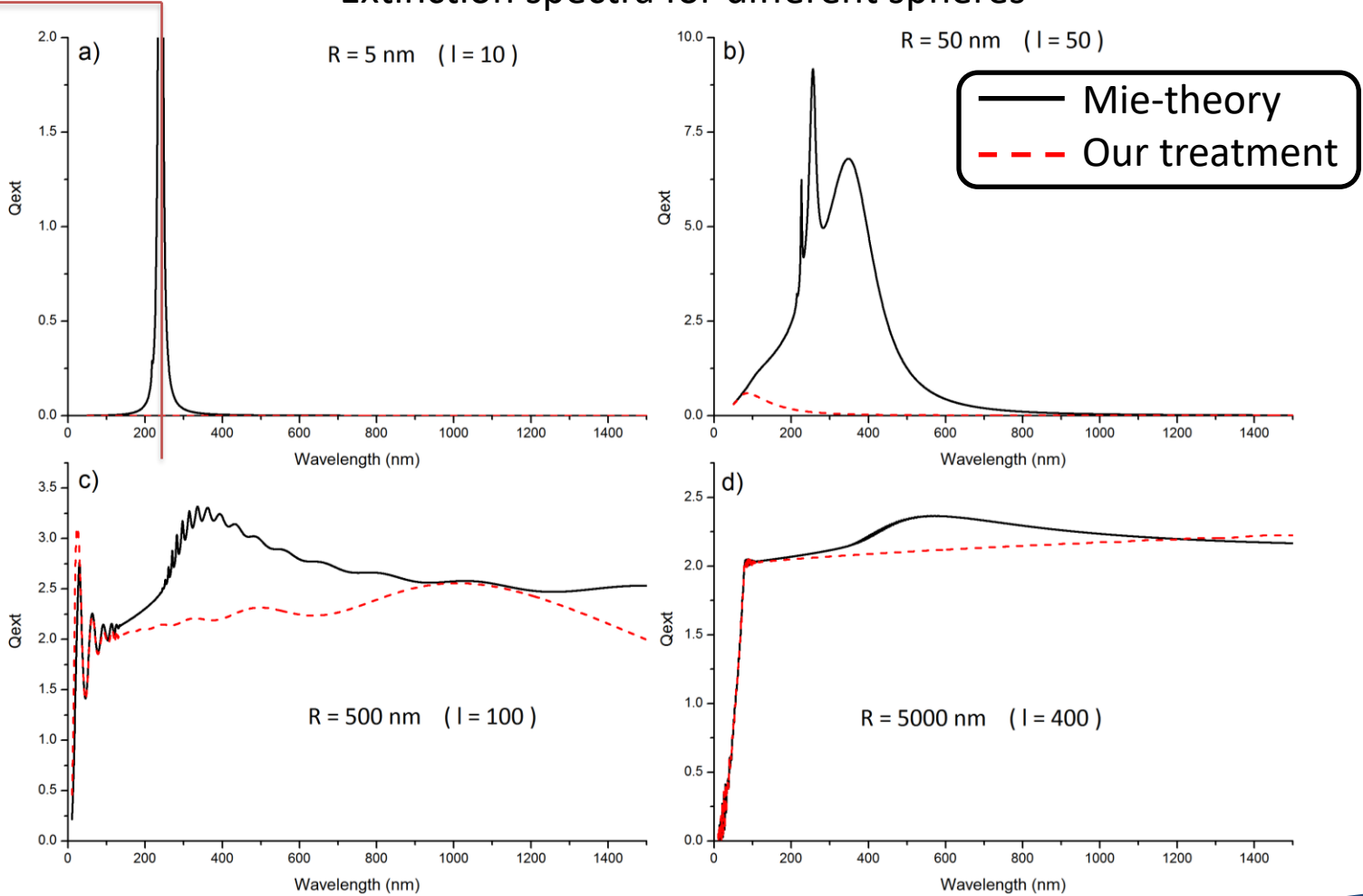
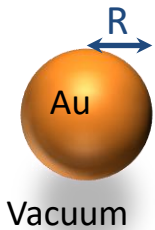
- What we want:
  - Inhomogeneity
    - » no dielectric function
    - » no  $\mathbf{D}$  &  $\mathbf{H}$  fields
    - » possibility to implement “quantum effects”
  - Longitudinal and transversal waves
    - » Helmholtz decomposition





## Extinction spectra for different spheres

Plasma oscillations for a sphere

$$\omega_{pl} \sqrt{\frac{l}{2l+1}}$$


- Analytical, alternative treatment of the Maxwell equations
- Avoiding some problems of Mie-theory
  - Inhomogeneity
  - Longitudinal and transversal waves
- Differences for even a Drude metal

Soon to be published