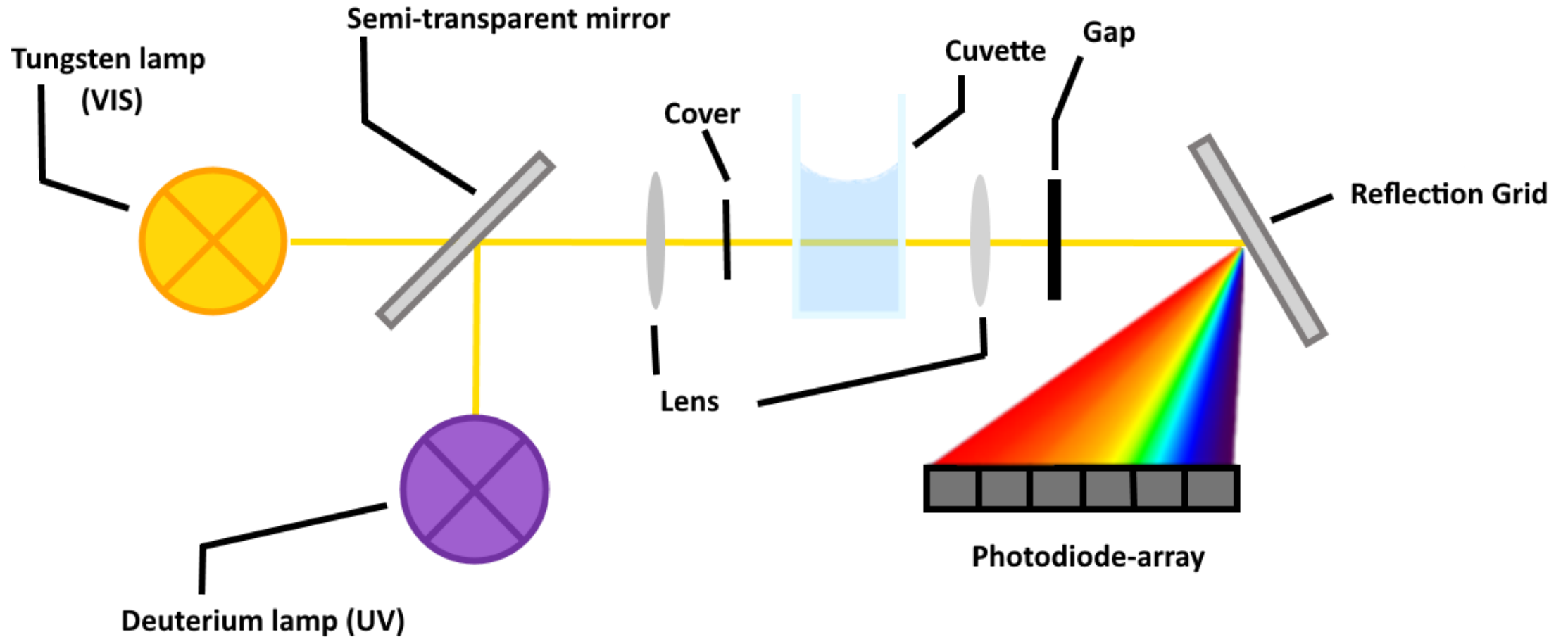




The Photometer

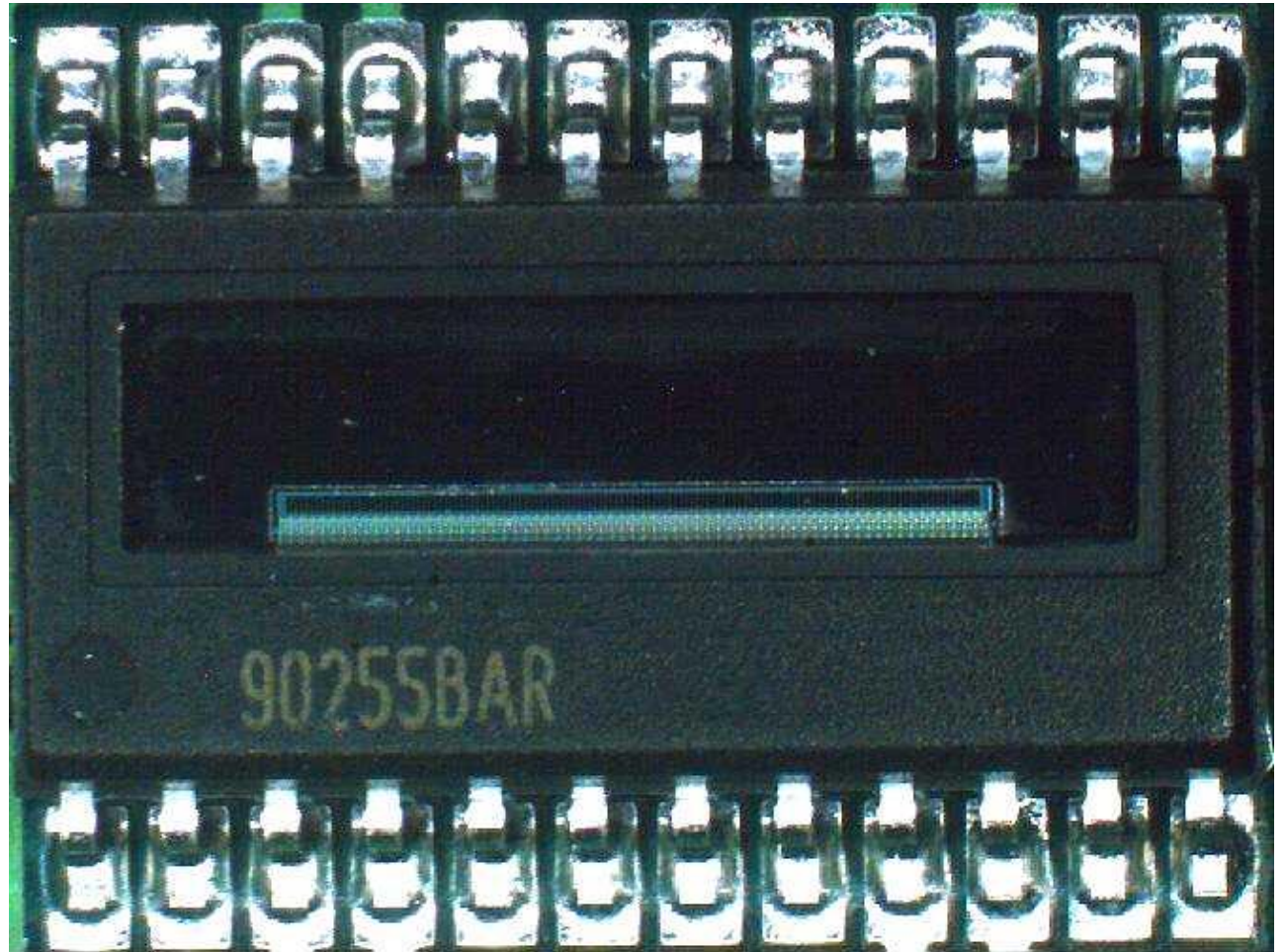
Antoni Sawa, Emilia
Koziol, Leonard Wlk

Construction of a Photometer

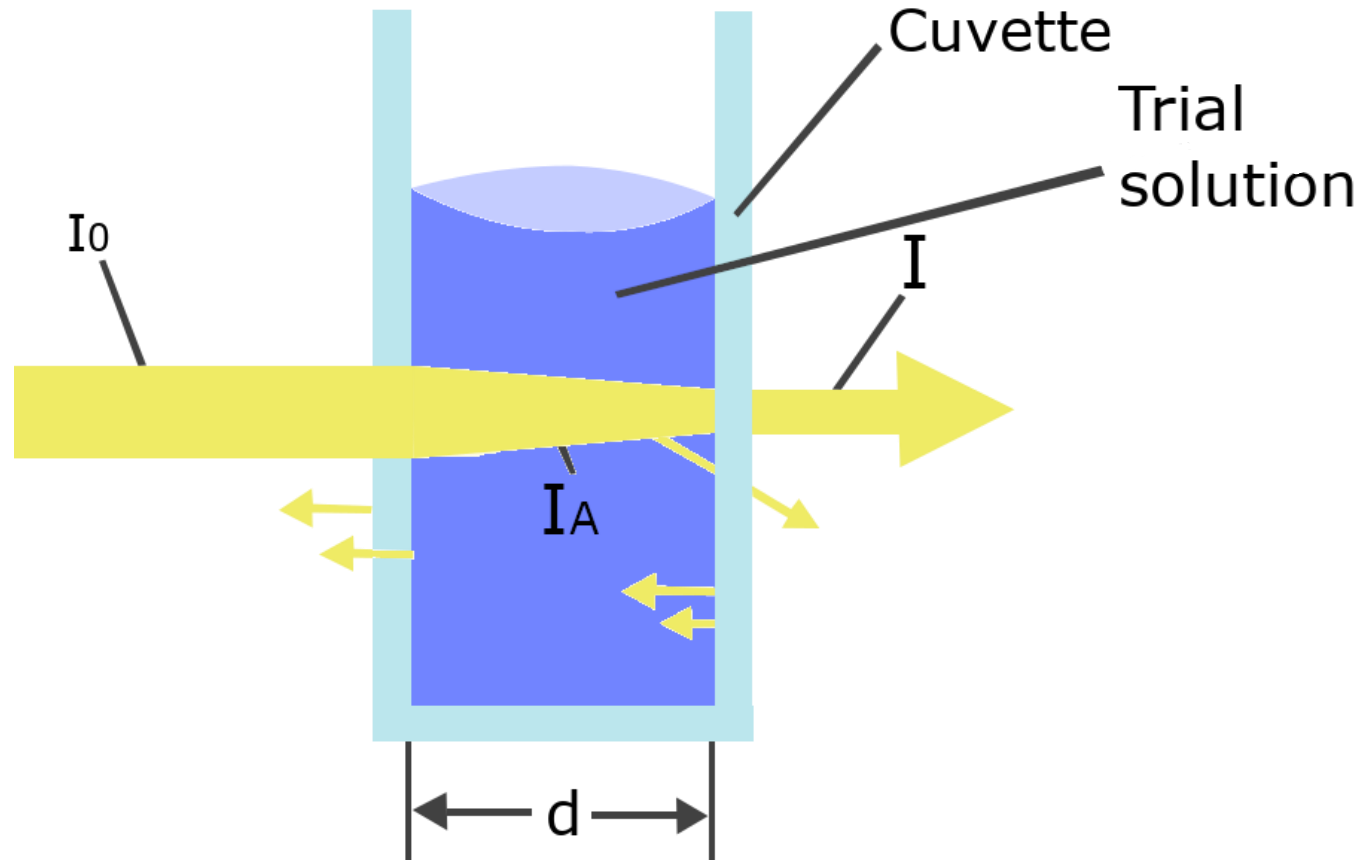


The PDA (photodiode array)

- Consists out of linearly arranged Photodiodes
- Spectral sensitivity: 200 – 1100 nm with semiconductor material: (Si)
- The PDA puts out the data either as an analog signal or through an analog-to-digital converter as a digital signal



The workings of a Photometer



Calculations used in connection with photometric measurement

- Transmission for wavelength $\lambda \rightarrow T(\lambda) = \frac{I(\lambda)}{I_0(\lambda)}$ (T only takes value between 0 and 1)
- Lambert-Beersche Law $\rightarrow E(\lambda) = \varepsilon(\lambda) \cdot d \cdot c$
- Absorbance for wavelength $\lambda \rightarrow E(\lambda) = \log\left(\frac{1}{T(\lambda)}\right) = \log\left(\frac{I_0(\lambda)}{I(\lambda)}\right)$
- Concentration formula based on LBL $\rightarrow c = \frac{E(\lambda)}{\varepsilon(\lambda) \cdot d}$

Sources

Hampel, Bruno: Absorptionsspektroskopie im Ultravioletten und sichtbaren Spektralbereich. 1. Aufl. Wiesbaden: Springer-Verlag, 1962, S. 37f.

Otto, Matthias: Analytische Chemie. 2. Aufl. Weinheim: WILEY-VCH Verlag GmbH, 2000, S. 270.

Images:

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