

Photometry exercises

1. Formulate a formula which expresses which fraction of photons emitted by a star are registered on the detector. Assume that the photons have wavelength λ and travel through ISM, atmosphere, two mirrors, a filter and then hit the detector.
2. Compute an actual fraction for a chosen wavelength and some typical numbers for the other components.
3. What is the general formula to convert between AB and Vega magnitudes using Jansky as flux units (see lecture sheet below)?
4. Find on the web conversion values between AB and Vega for SDSS observations.

I₀: Vega vs AB

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$$m = -2.5 \log_{10} \left(\frac{S}{S_0} \right)$$

$$m = 8.9 - 2.5 \log_{10} \left(\frac{S}{Jy} \right)$$

NB: $S = \int I(\lambda) \text{SystemResponse}(\lambda) d\lambda$

Large-scale surveys offer tertiary standards