Biomicroscopy I - Exercise Sheet 14
Bonus questions

December 17, 2024

1 Bonus question: Siemens star in a $4f$ system

Consider a Siemens star as seen in Figure 1a. In the Fourier plane of the 4f-system, you now place the spatial frequency filter shown in Figure 1b.

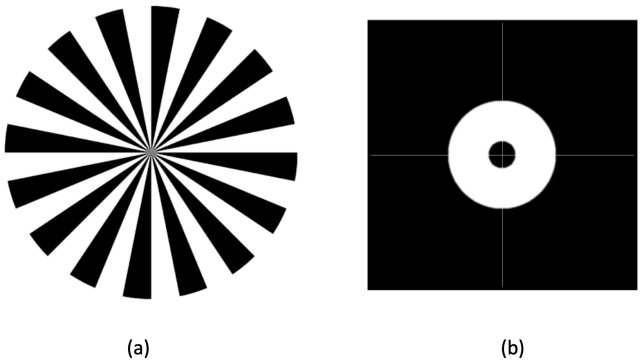

Figure 1: **a)** Siemens star as an input to a $4f$ system. **b)** Spatial frequency filter placed in the Fourier plane

Which filtered output from Figure 2 do you get using the spatial frequency filter of Figure 1b?

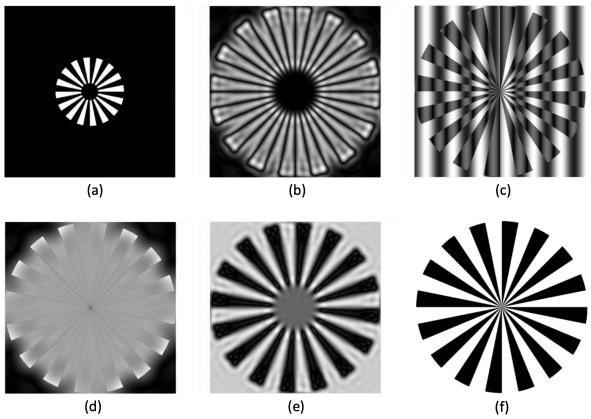

Figure 2: A set of different images at the output of the $4f$ system

2 Bonus question: fluorescence microscopy

A. Name three commonly used illumination sources in fluorescence microscopy.

B. Name three commonly used detectors in fluorescence microscopy.

C. Name four commonly used fluorescence markers in fluorescence microscopy.

3 Bonus question: diffraction grating

Assume that you put a diffraction grating in the input plane and a screen at the output plane, shown in Figure 3. The screen distance L is sufficiently large to observe a clear diffraction pattern. Assume that the incident light is coming from a white light source.

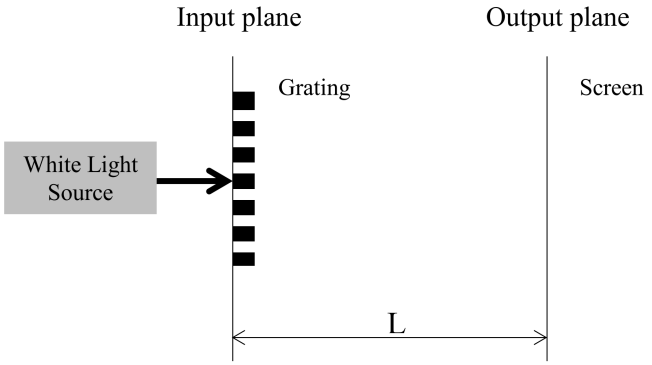

Figure 3: Diffraction grating and white light illumination

Which pattern will you observe on the screen? Choose from Figure 4.

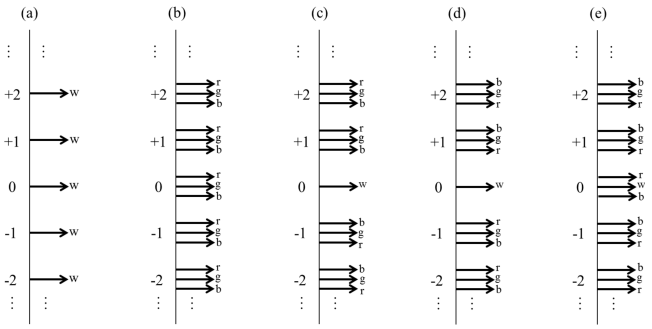

Figure 4: Possible diffraction patterns (w: white; r: red; g: green; b: blue)

4 Bonus question: aberrations

Define the type of aberrations presented in the Fig. 5 and explain shortly your choice.

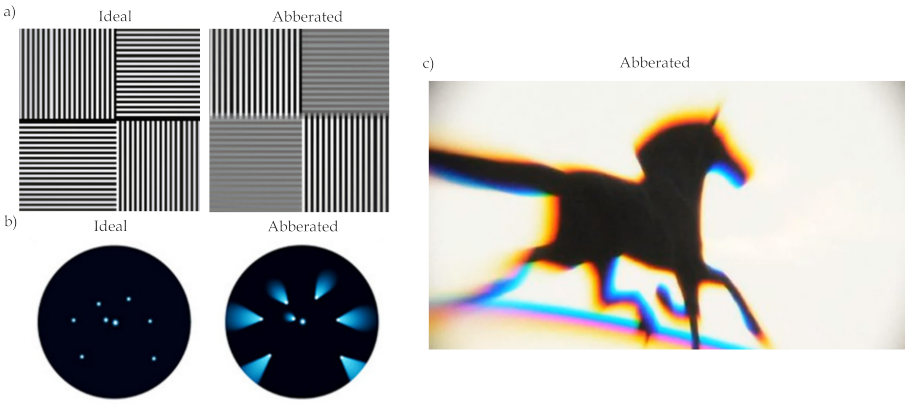

Figure 5: Examples for different types of optical aberrations