

# Examination in Optical physics 111017

All examination aids except those which provide contact with the outer world are allowed. Draw figures whenever possible!

## 1-2

Construct (in thin lens approximation) a telescopic aim that does not need an inverting system to correct for an image which is upside down. This is preferably achieved by creating two real intermediate images that have the same size.

The following demands should be met:

Total angular magnification = 2

Entrance pupil diameter at least 40 mm

No lenses with f-number smaller than 1,0

Field of view at least  $\pm 7,5^\circ$

Exit pupil more than 60 mm after last lens

Solution should contain a ray diagram with all distances and diameters clearly written, and pupils clearly marked.

3

In the glasses used to watch 3D movies one  $\lambda/4$  plate is followed by a linear polarizer. What should be the angle between the optical axis of the  $\lambda/4$  plate and the easy pass direction of the polarizer, if you only want one of the circular polarizations (CW or CCW) to pass.

4

What will be the modulation in the interference pattern of a Twyman Green interferometer ("Laser Michelson") if beam splitter has a reflectance R (not equal to 0,50) ?

What would it be (different in different patterns) in a Mach Zender interferometer if the last beam splitter also had a reflectance R ?

Coherence can be assumed to be perfect

5

Assume we use a laser with two longitudinal modes where one has twice the power of the other, in a Twyman Green interferometer ( with  $R = 0,5$  for the beamsplitters).

What will be the maximum and minimum visibility of the interference pattern?

6

A sector star is used as an object in a 4F fourier optics setup. A horizontal band through the center is blocked in the fourier plane. Sketch the resulting (filtered) image of the object. It must be clear from the sketch where the pattern is clear and where it is blurred.

Write your mail address on the envelope!!!