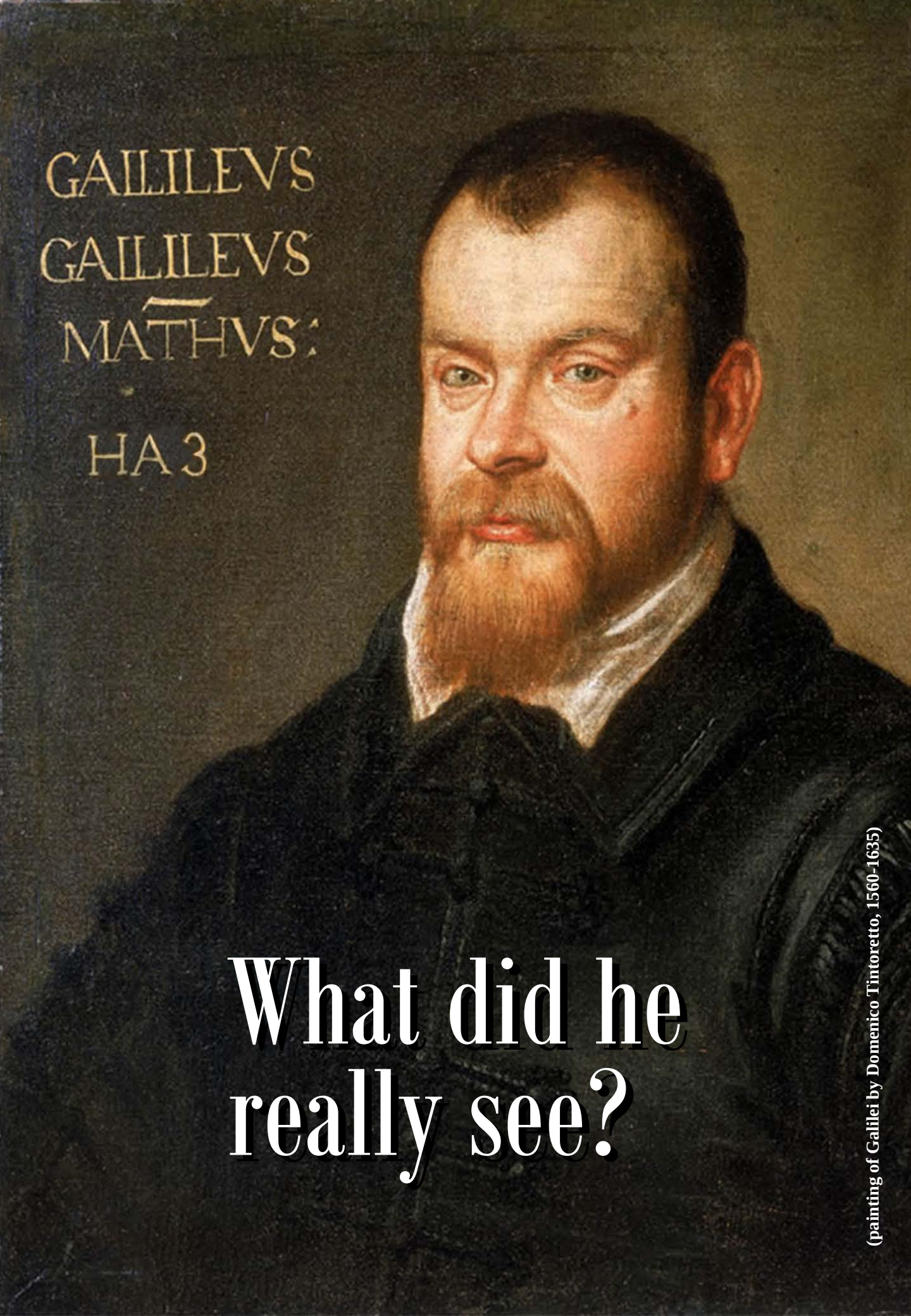
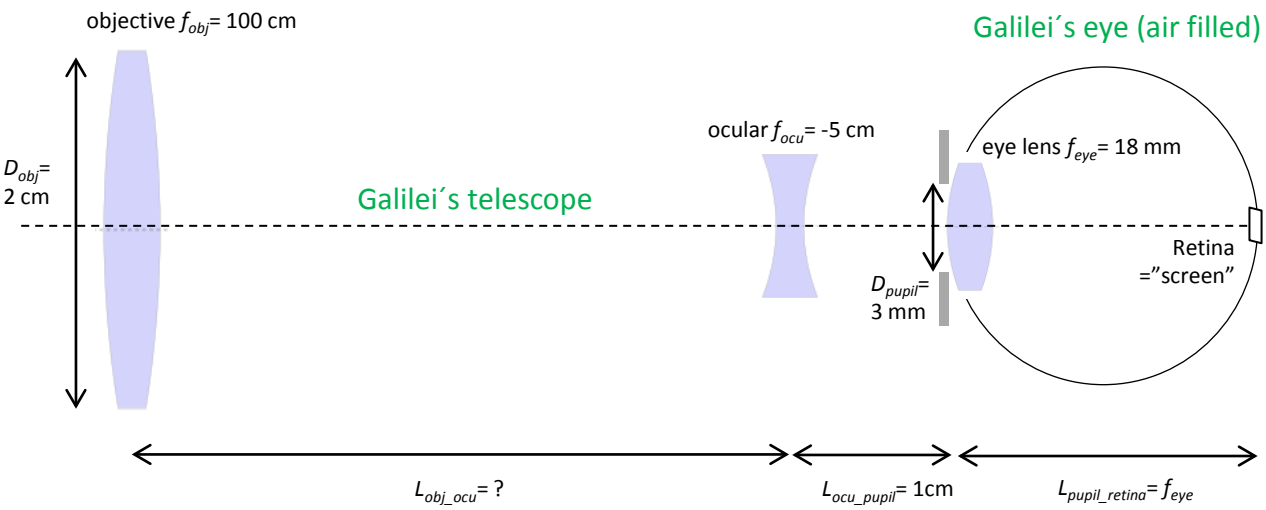


What did he really see?

(painting of Galilei by Domenico Tintoretto, 1560-1635)

An original telescope tube made by Galilei. However, none of his telescopes exists complete with the original lenses.

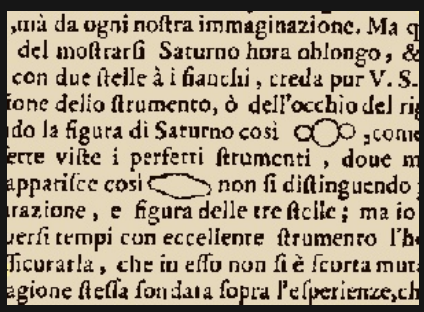
Galilei´s imaging system



Galileo Galilei´s telescopes almost look like toys – the tube diameters are very small making them look more like "sticks" than optical intruments that revolutionized our perception of the solar system. The small diameter is because only lenses with small diameters could be produced with fair quality.

One of Galilei´s famous discoveries was that there is something strange about the planet Saturn – the most distant planet known by the time:

DIALOGO
DI
GALILEO GALILEI LINCEO
MATEMATICO SOPRAORDINARIO
DELLO STVDIO DI PISA.



,uià da ogni noſtra immaginazione. Ma q
del moſtrarſi Saturno hora oblongo, &
con due ſtelle à i fianchi, creda pur V. S.
ione delio ſtrumento, ò dell'occhio del ri
do la figura di Saturno coſi ,cone
erte viſte i perfetti ſtrumenti, doue m
apparifce coſi non ſi diſtinguendo
razione, e figura delle tre ſtelle; ma io
erſi tempi con eccellente ſtrumento l'h
ſicurarla, che in eſſo non ſi è ſcorta mut
agione ſteſſa fondata ſopra l'eſperienze,ch

The little drawings are his interpretation of something he could never imagine the true nature of – the planet Saturn with its marvellous rings. But what precisely did he see?

1. Simulate the intensity distribution on Galileo Galilei´s retina, for a "typical" wavelength, as he looked in his telescope towards Saturn in 1609! In your opinion, did he have a chance to realize that Saturn has rings? Use the template on the course home page for your Matlab program. **(End of 1)**

2. To see the difference his telescope made, also simulate the intensity distribution on the retina when Saturn is observed without a telescope, i.e. with a naked eye (use the Galilei model for the eye also in this case)! Use the same size for the numerical window in the retina plane as in Task 1. **(End of 2)**