

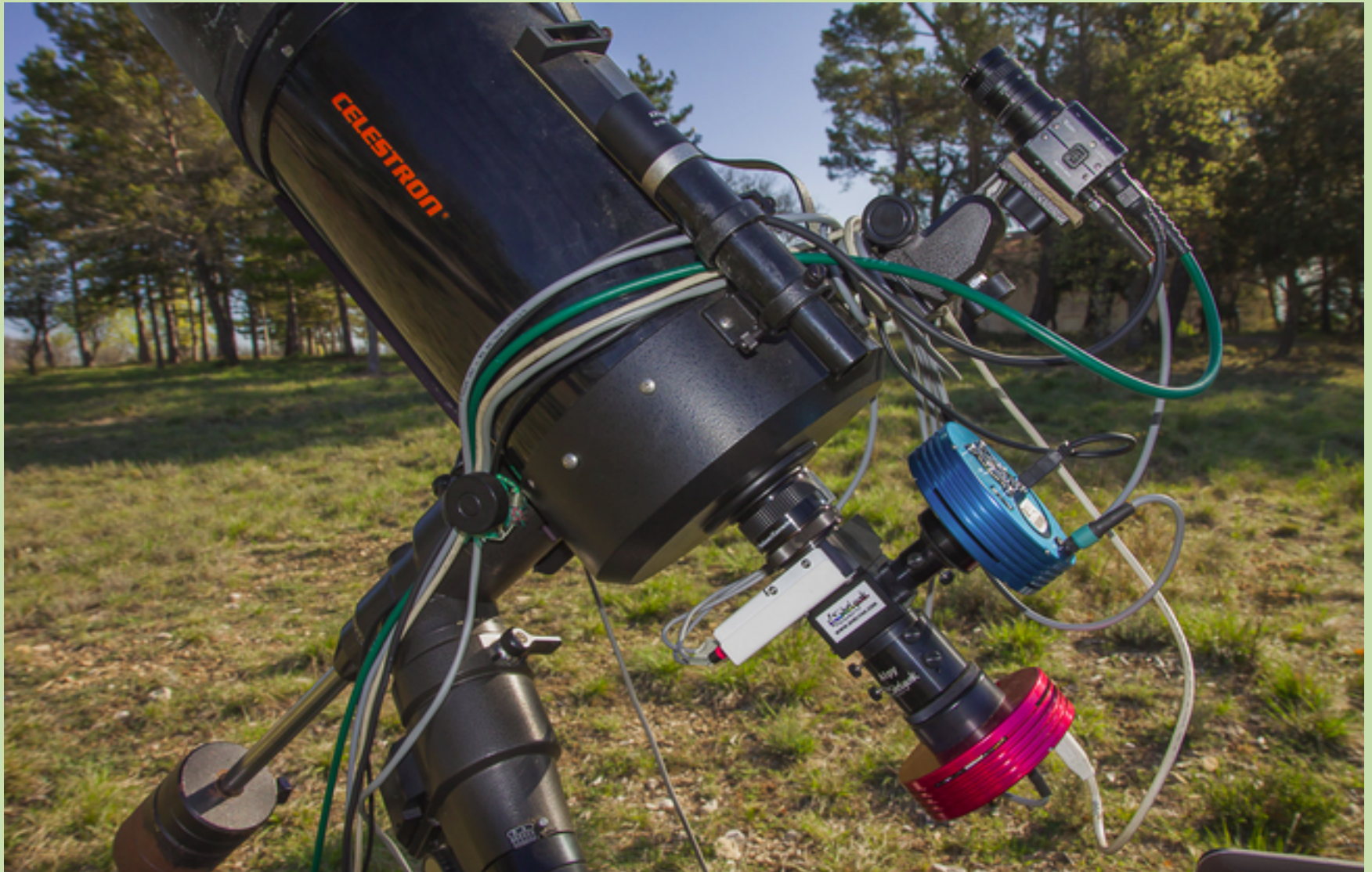


Spectroscopy instruments

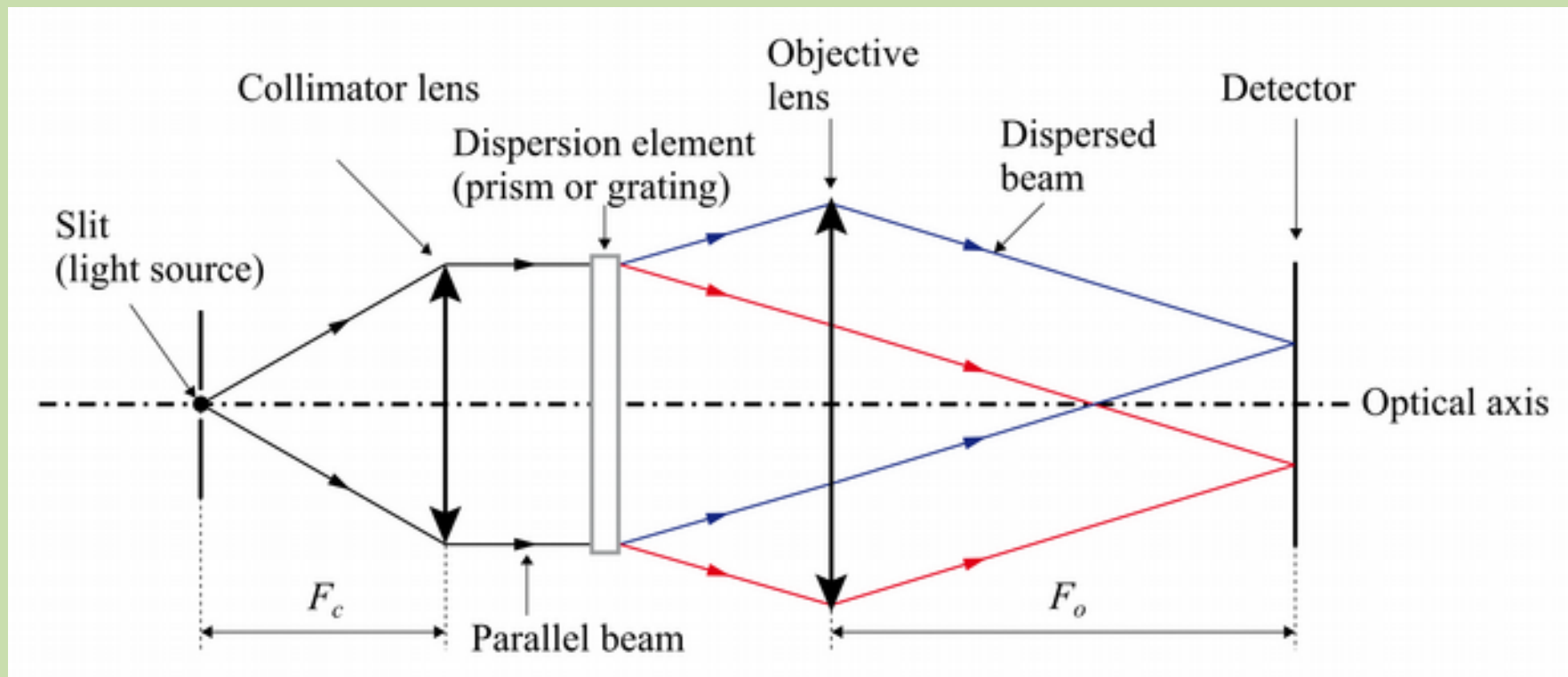
Sacramento Mountains Spectro Workshop - 2
February 22nd - 24th, 2019

François Cochard
francois.cochard@shelyak.com

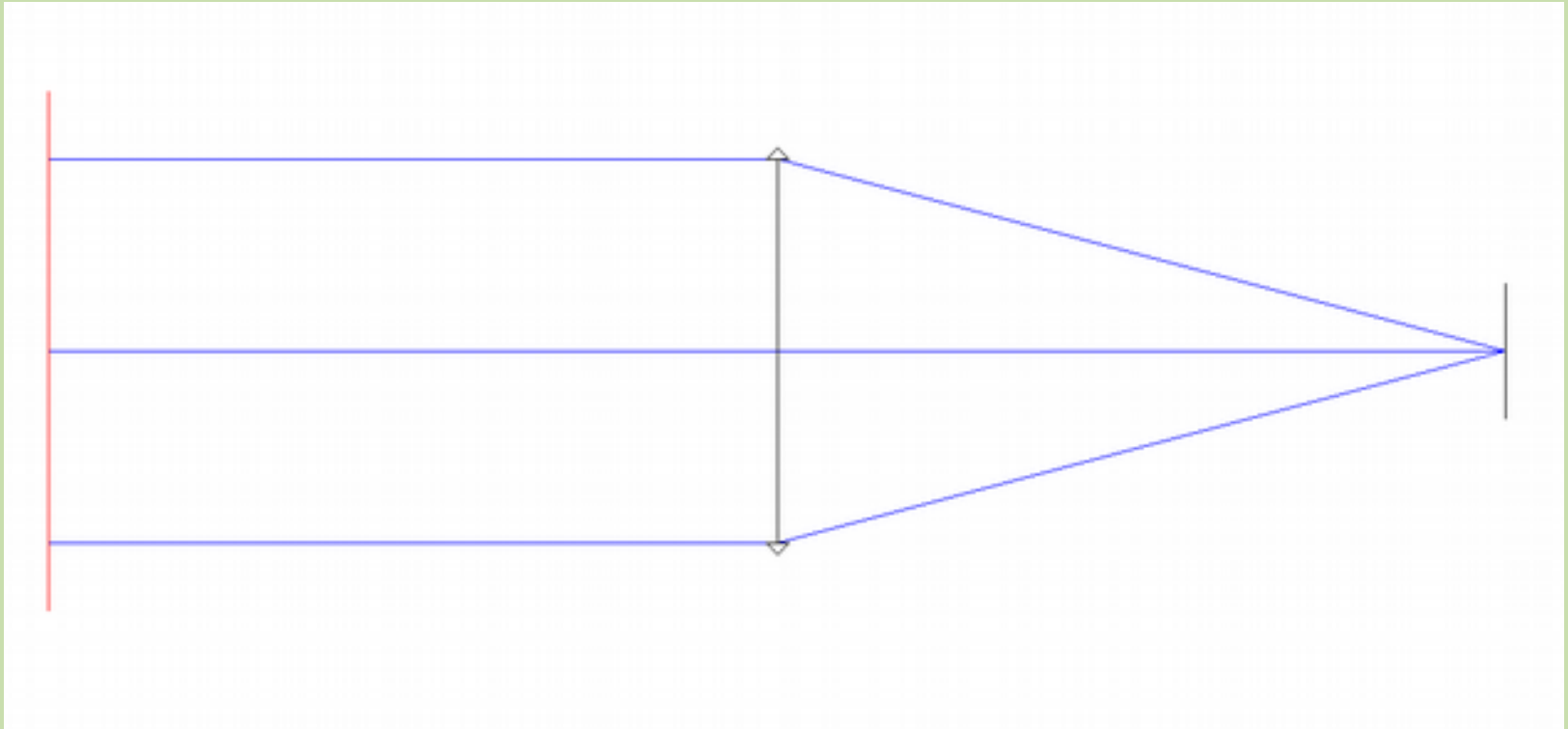
The instrument



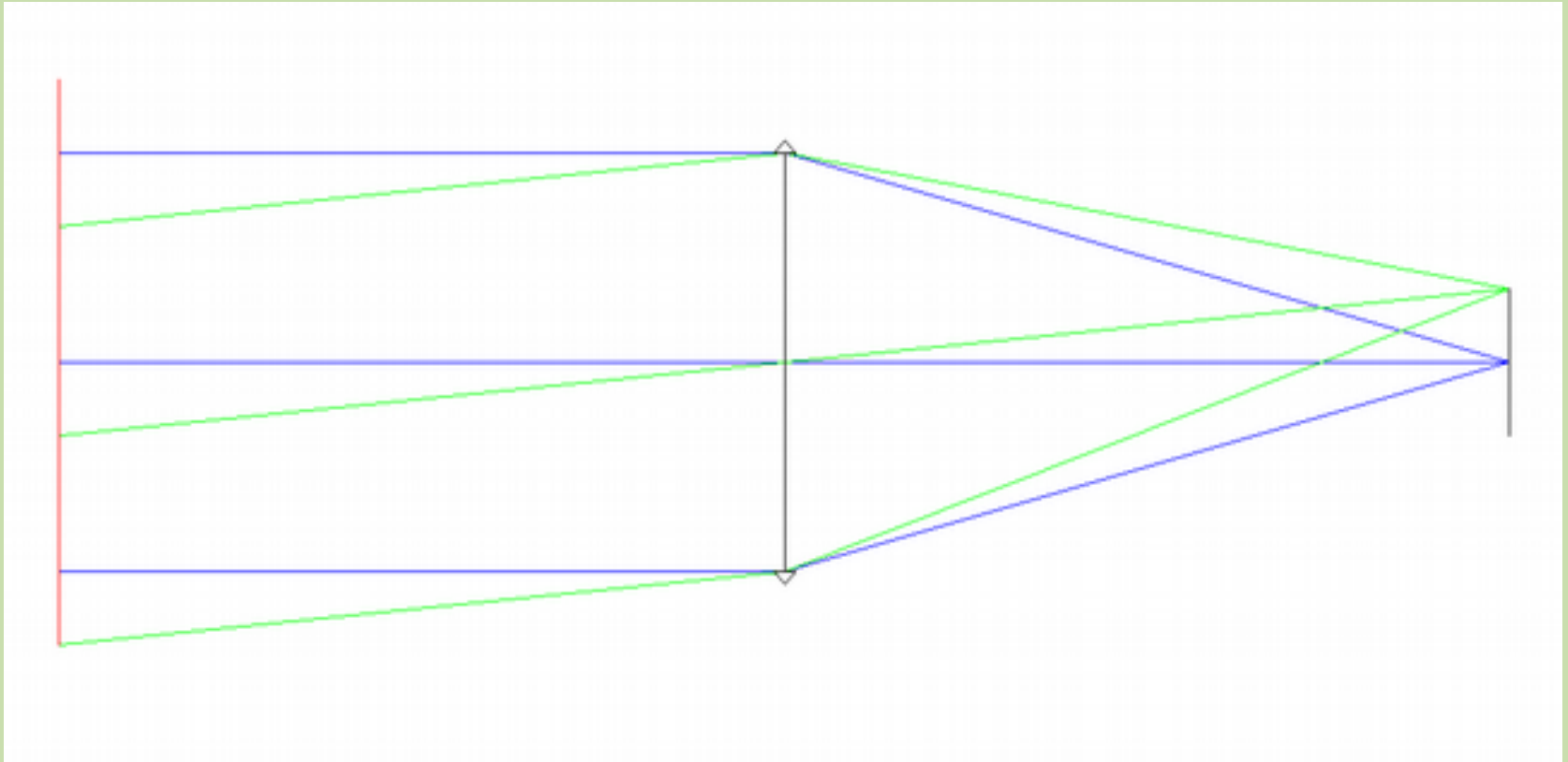
Spectroscope principle



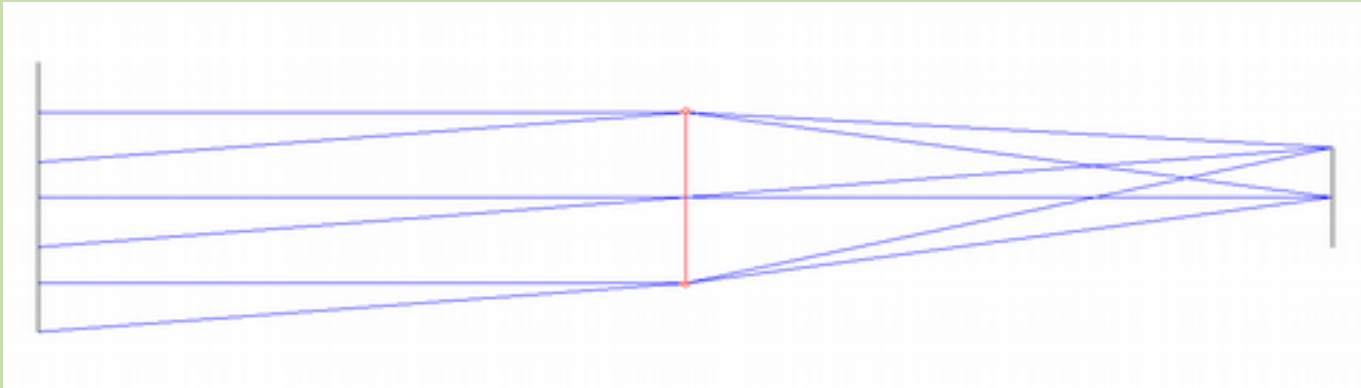
A simple lens



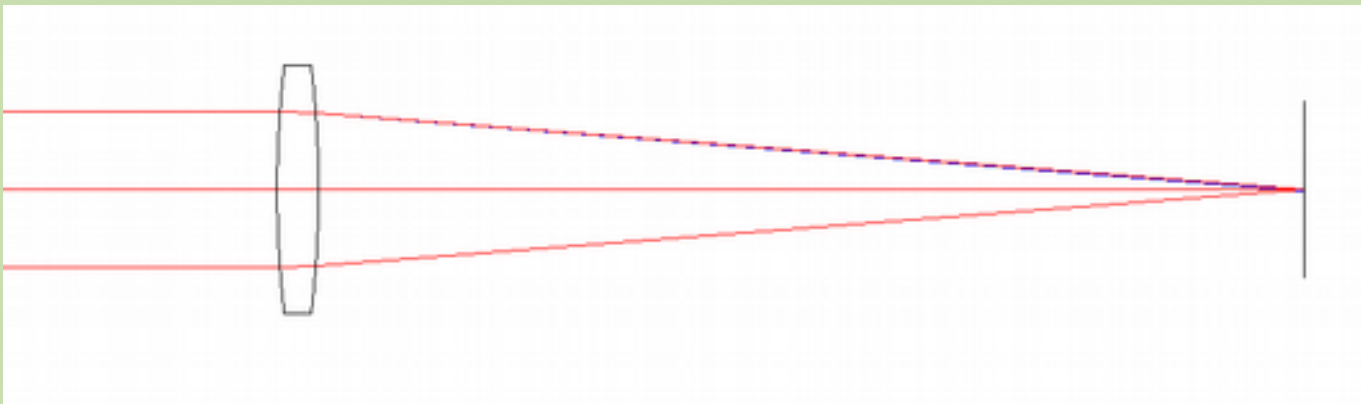
A simple lens



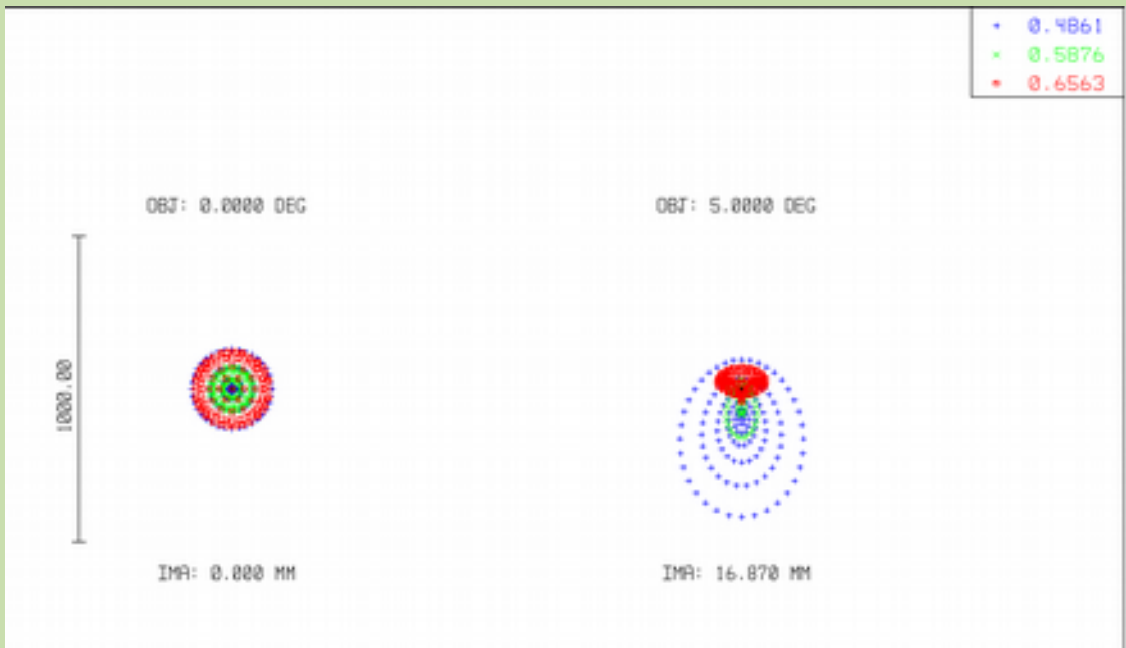
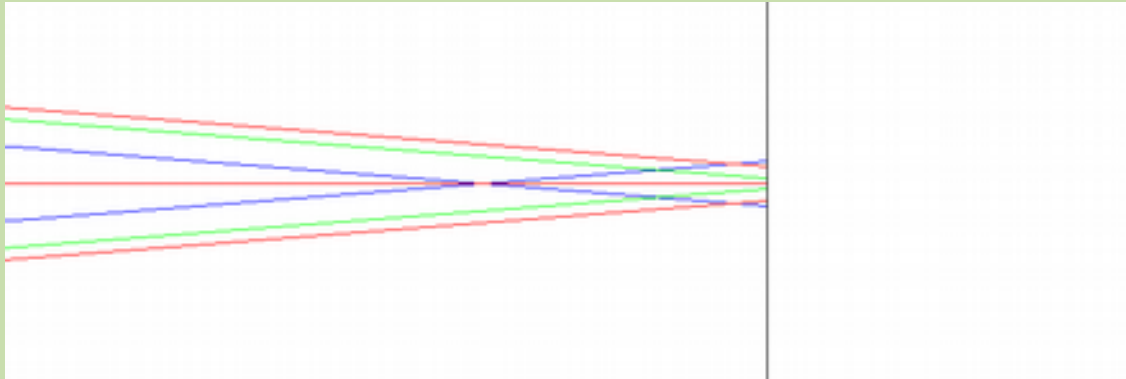
Chromatism & aberrations



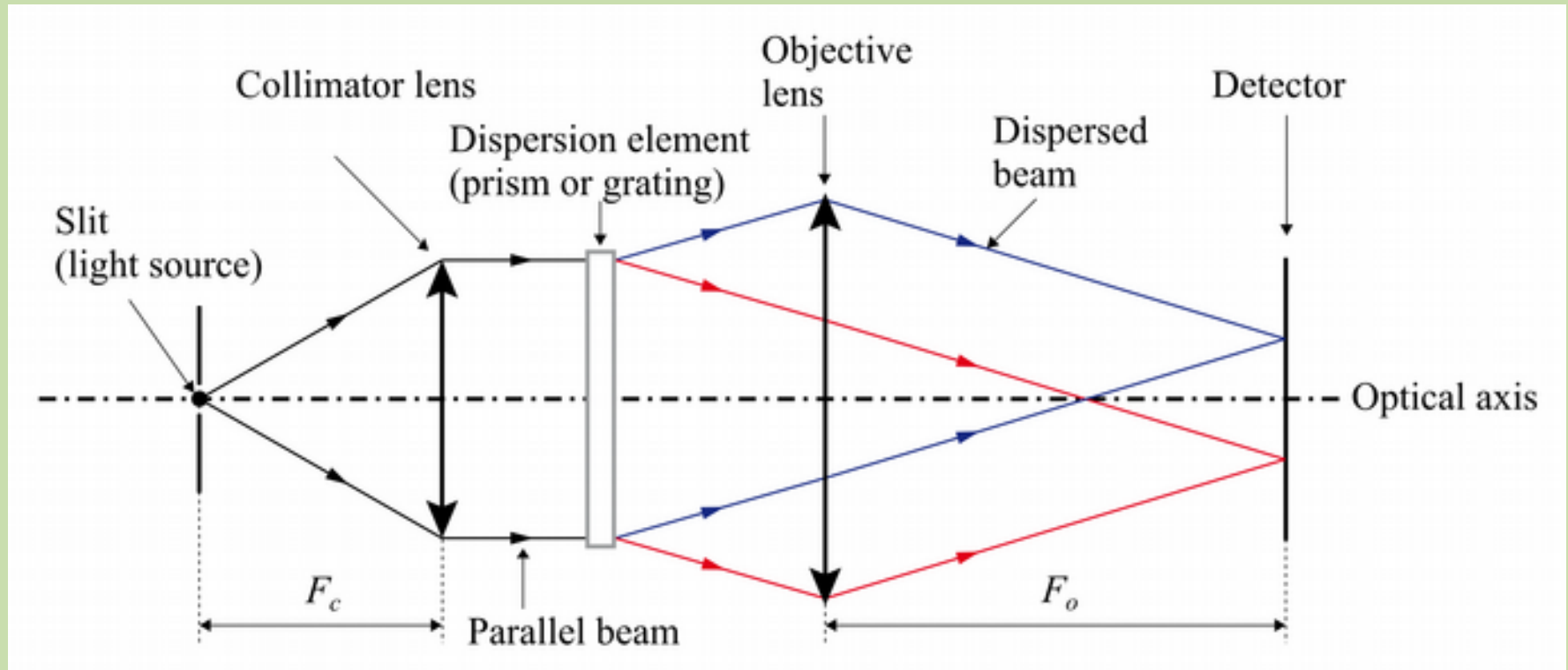
$D = 30\text{mm}$ $F = 200\text{mm}$

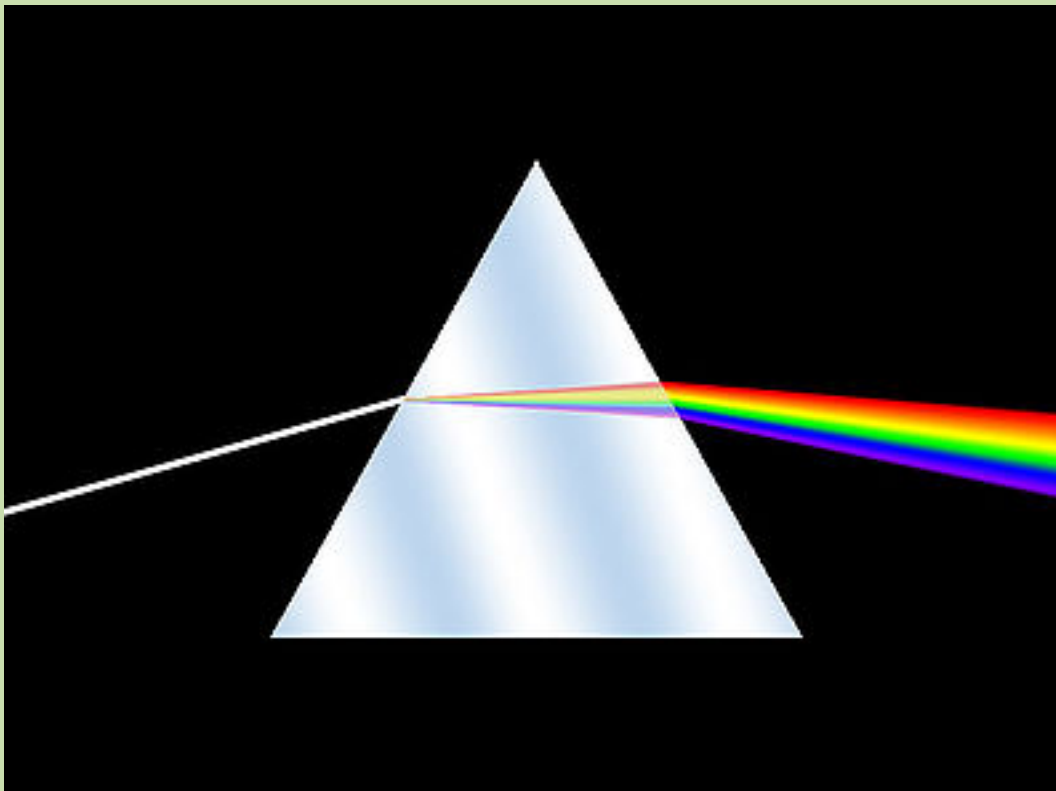


Chromatism & aberrations



Spectroscope principle



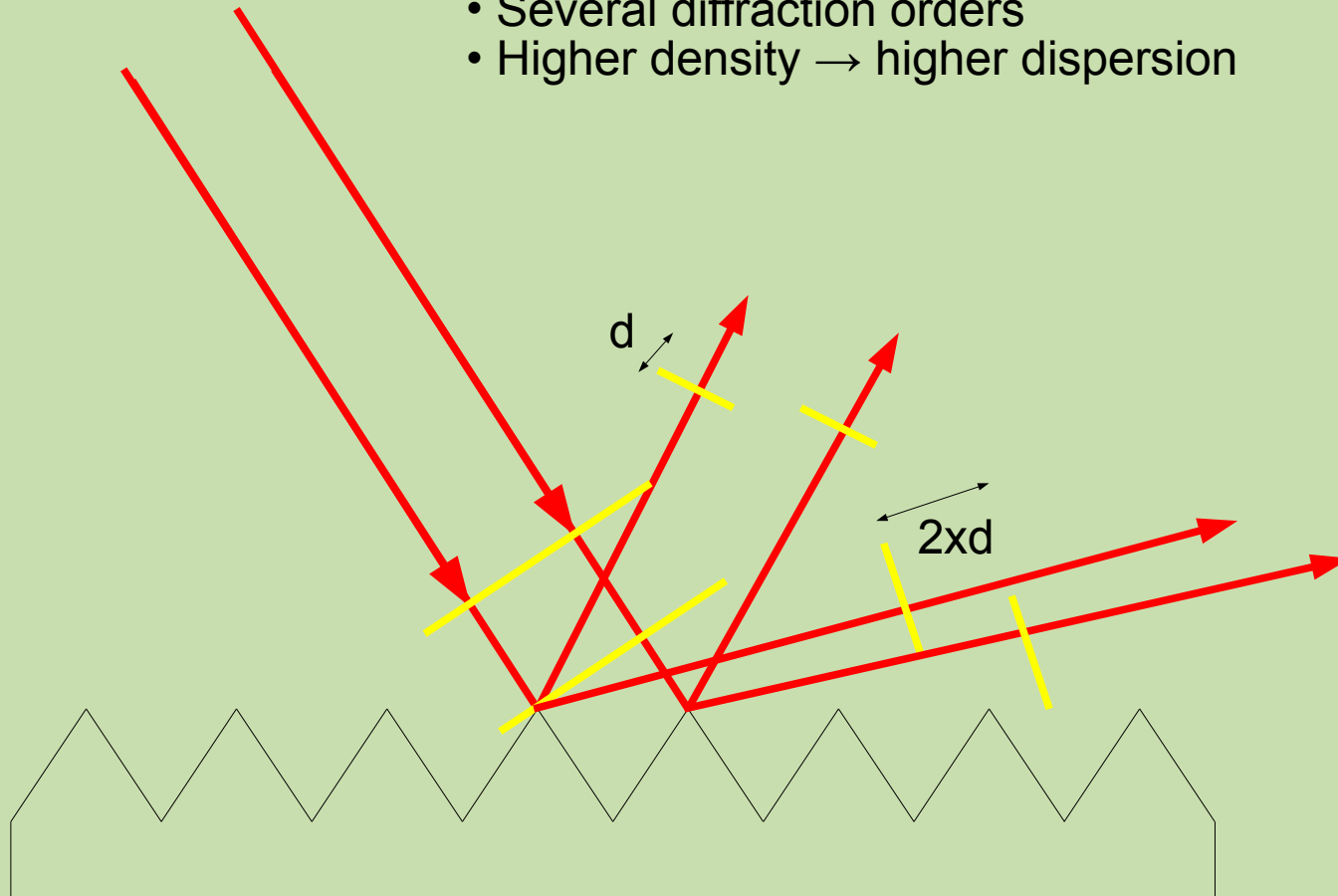


Non-linear dispersion

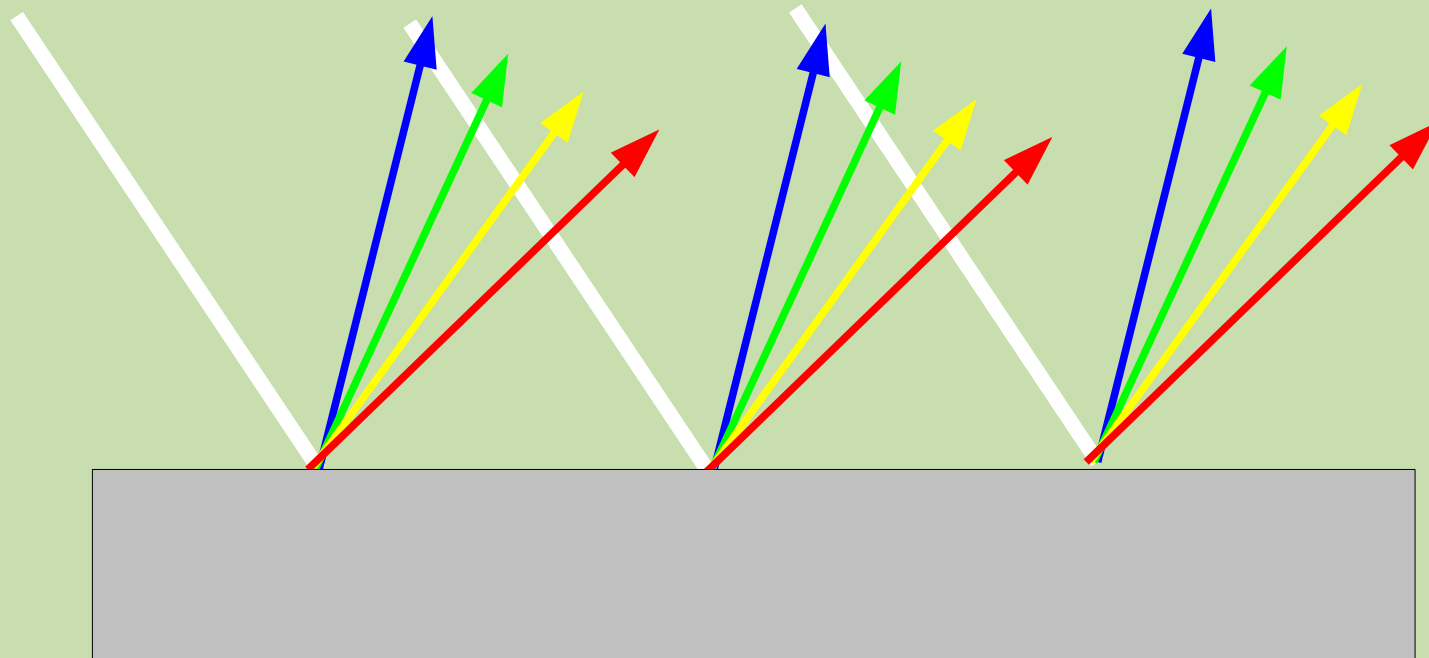
High efficiency

Diffraction grating

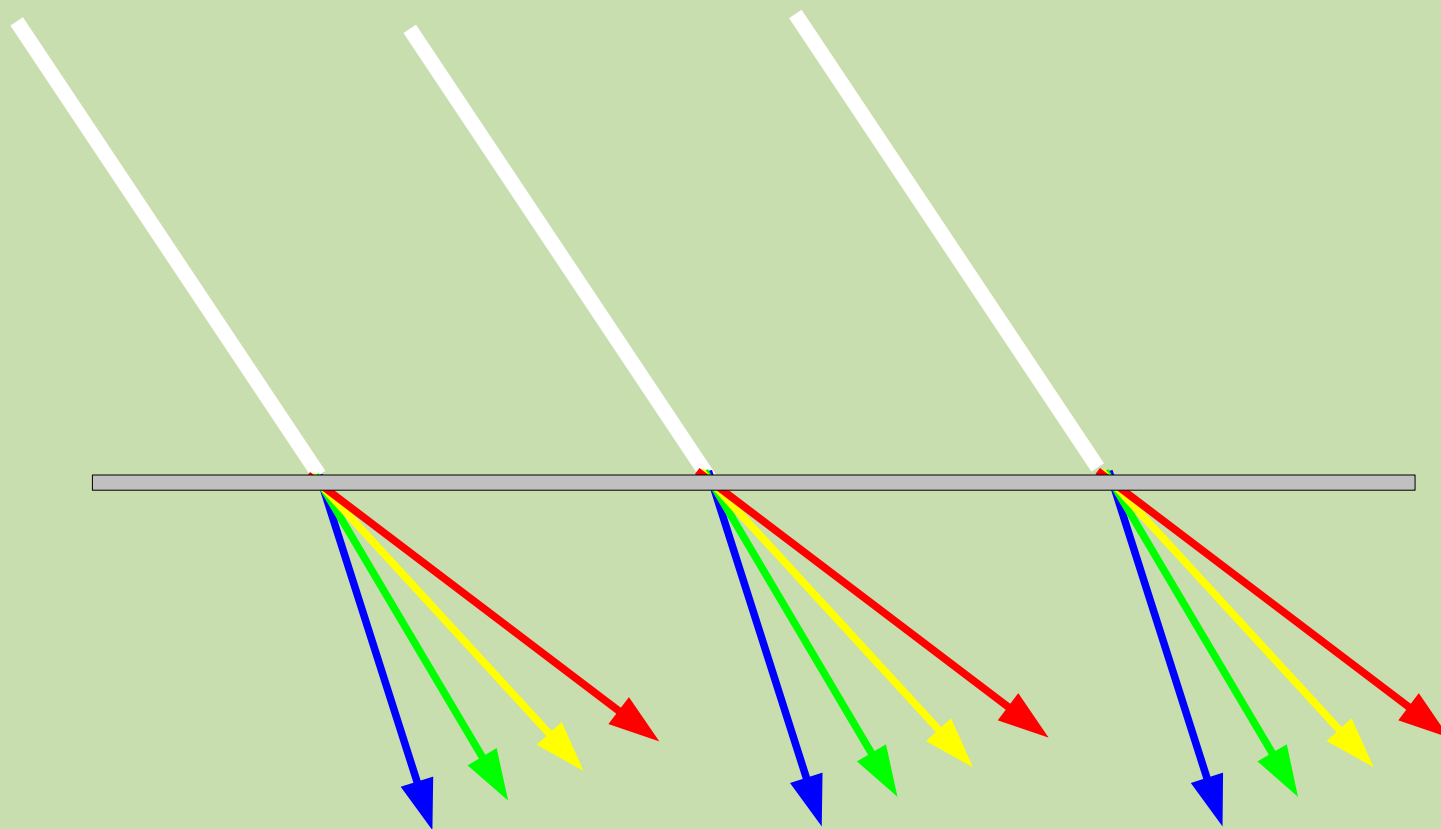
- High dispersion
- ~linear dispersion
- Several diffraction orders
- Higher density \rightarrow higher dispersion



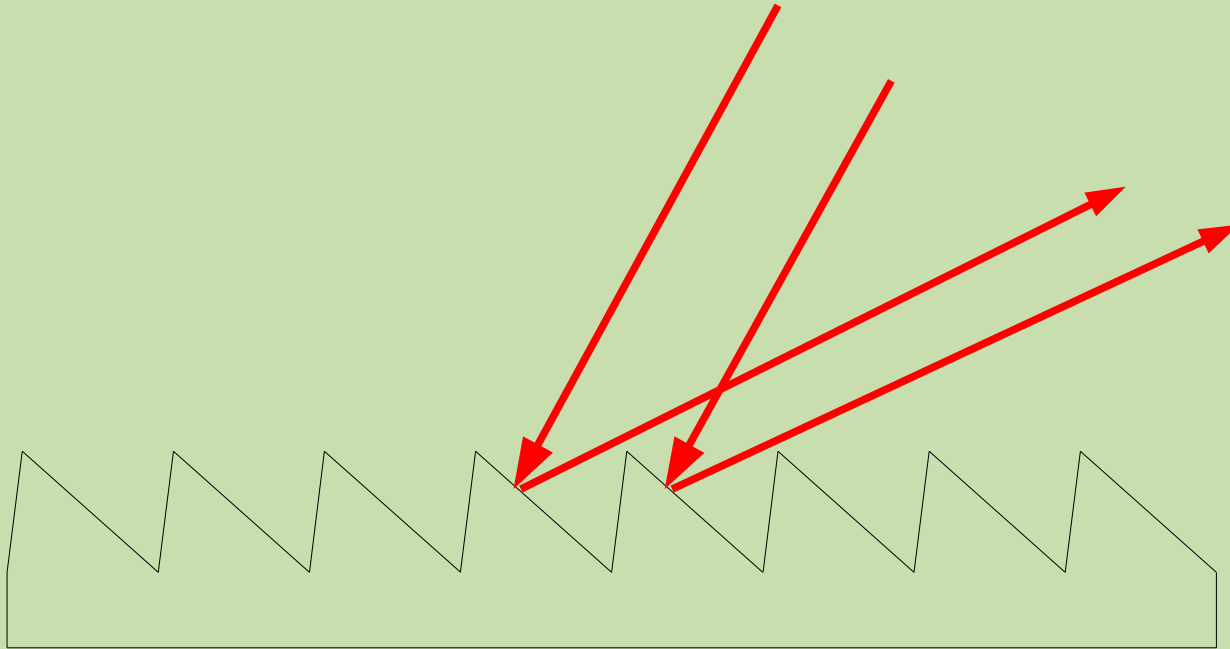
Reflexion grating



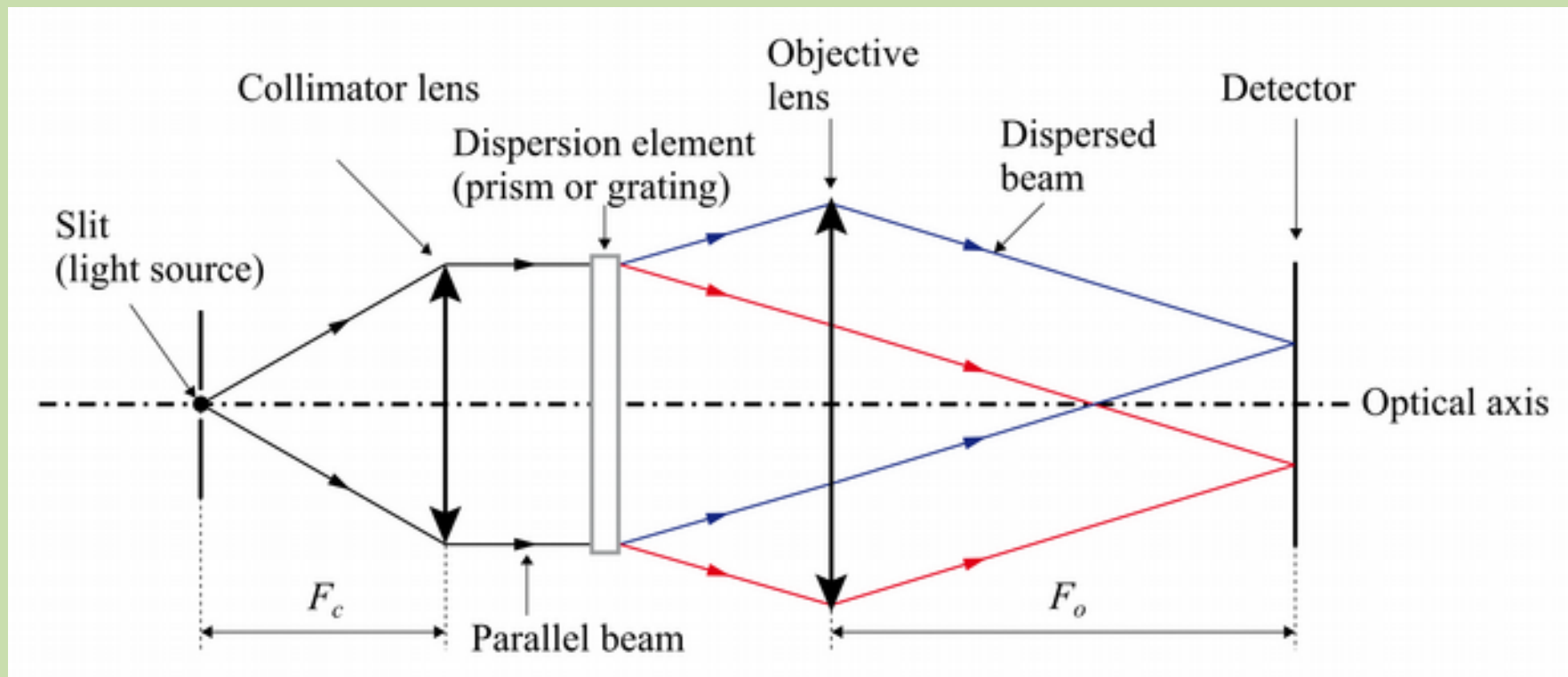
Transmission grating



Réseau blazé (*blazed grating*)

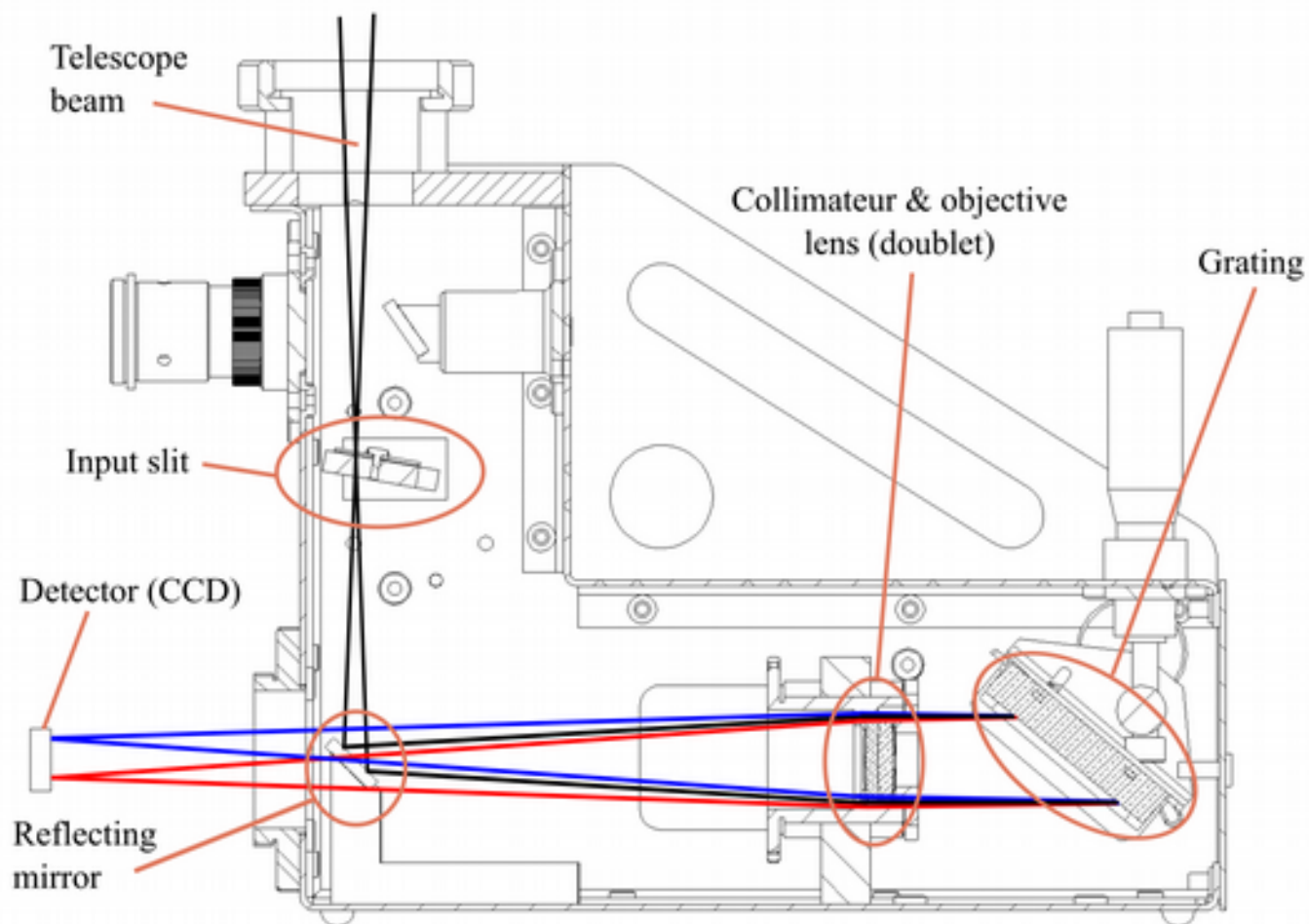


Spectroscope principle





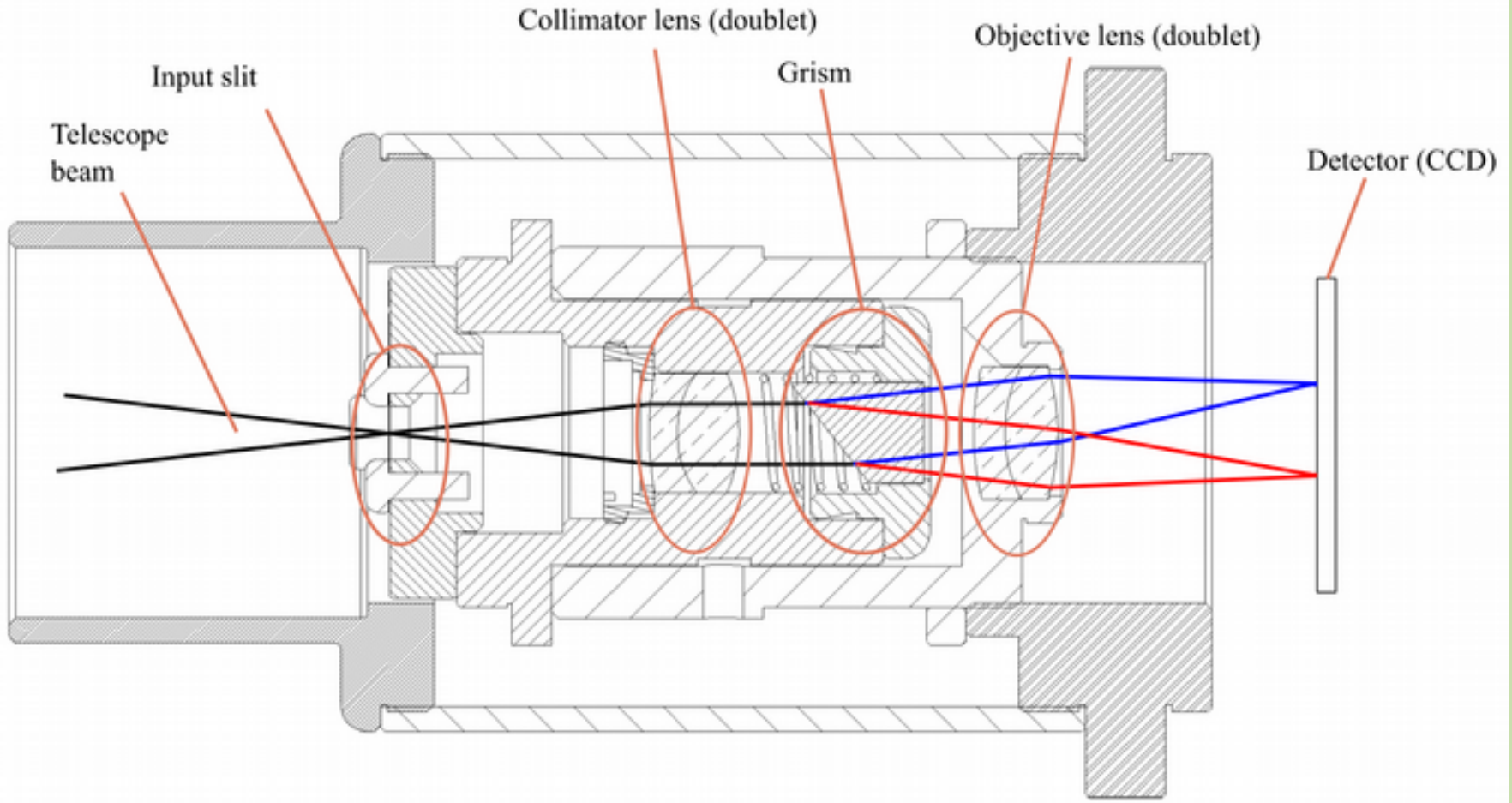
Lhires III architecture

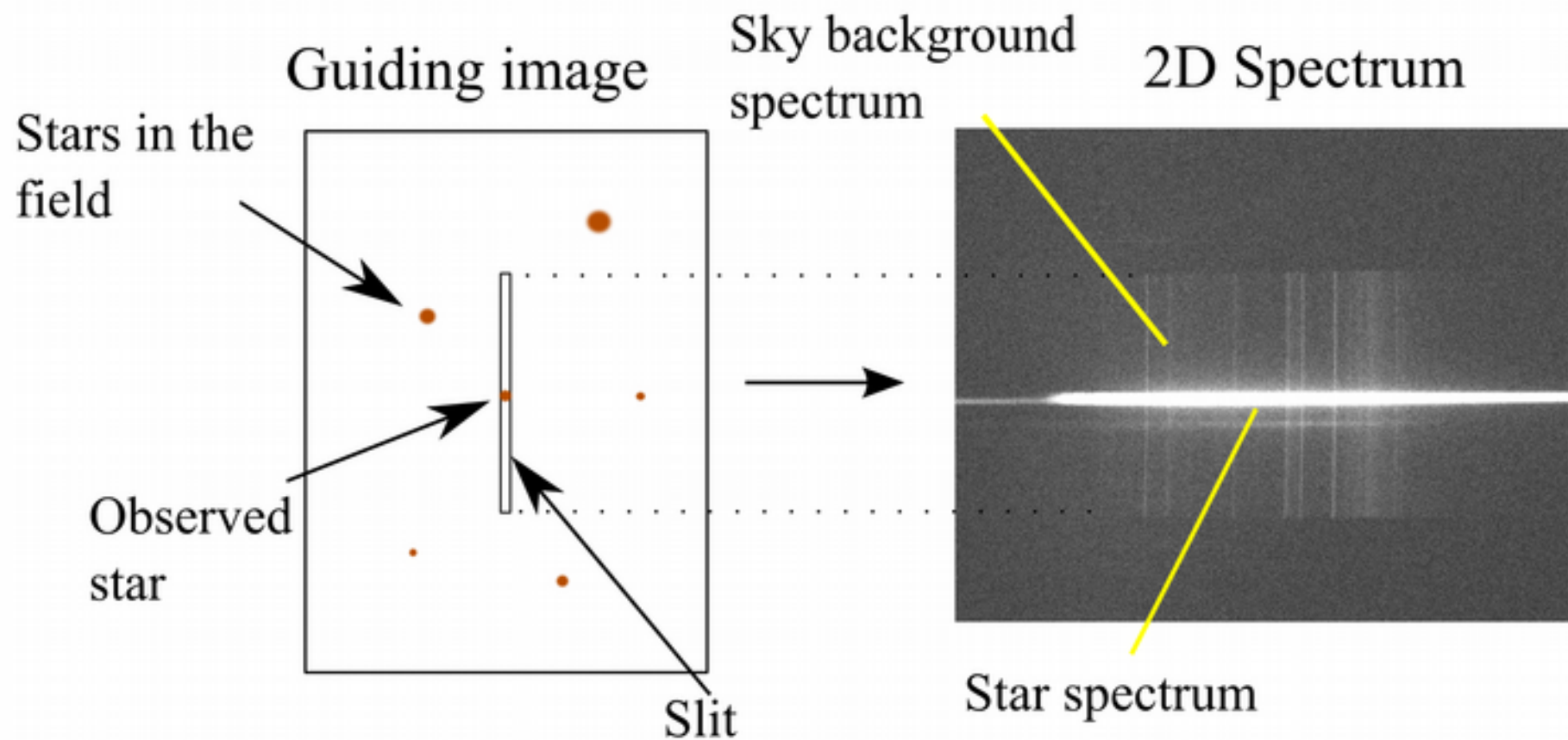


A spectroscope: Alpy 600

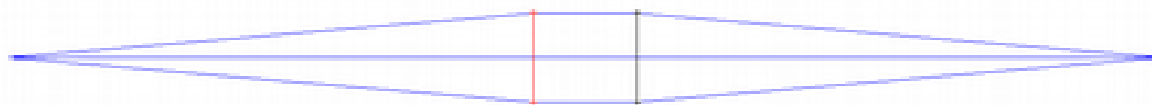
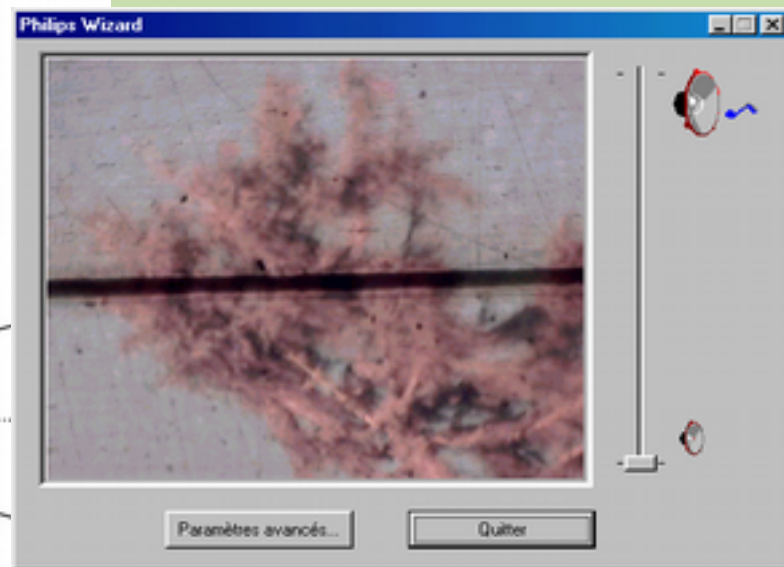
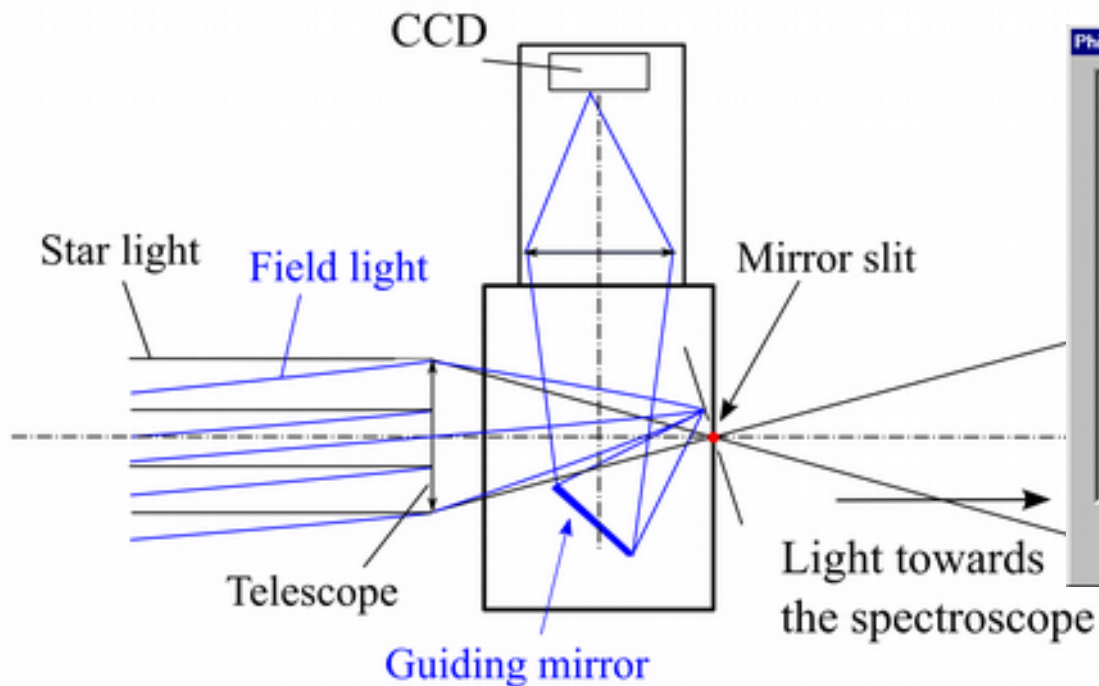
- Modular
- Compact & robust
- Low resolution : whole visible spectrum
- Slit spectroscope







We look at the slit with a 2nd camera

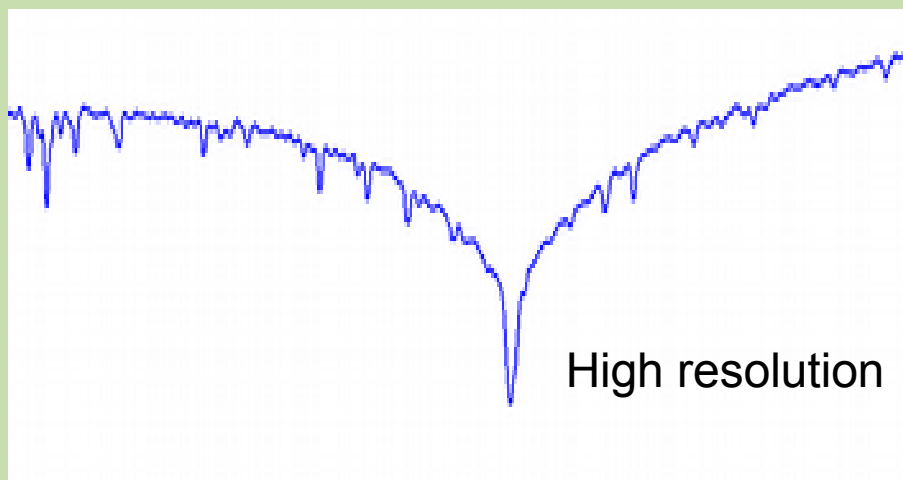
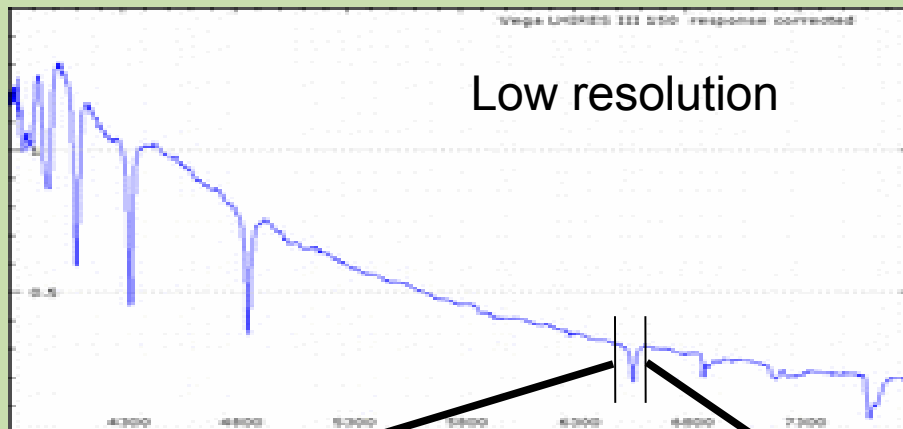


Transport d'image



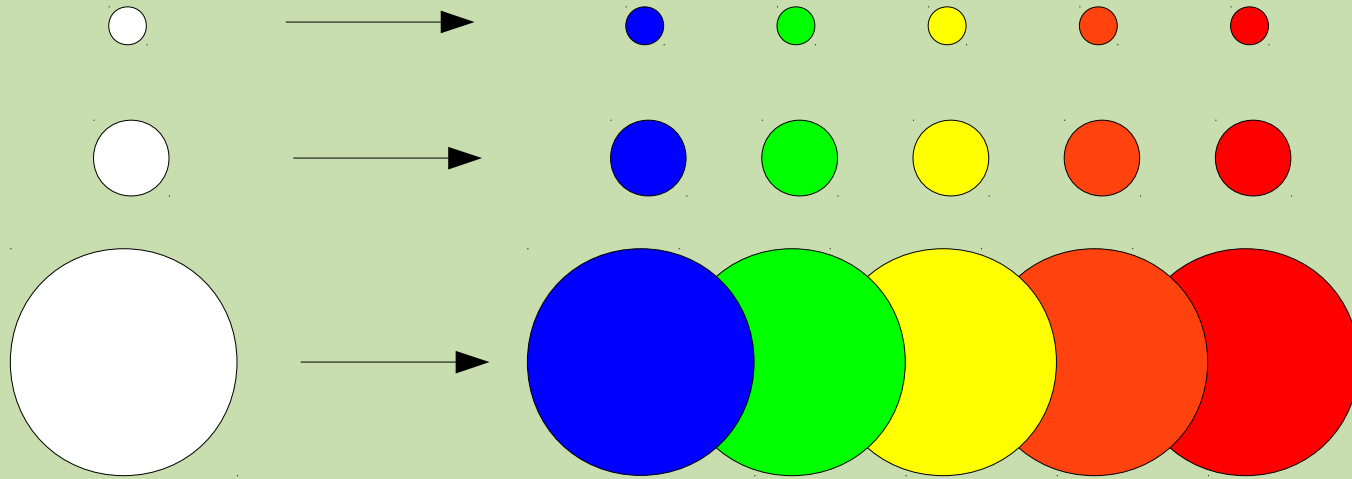
Key parameters

- **Resolution : ability to distinguish details**
 - **Do not mix with dispersion**
- **Spectral domain coverage**
- **Slit size**
- **F-ratio (luminosity)**
- **Backfocus (mechanics)**

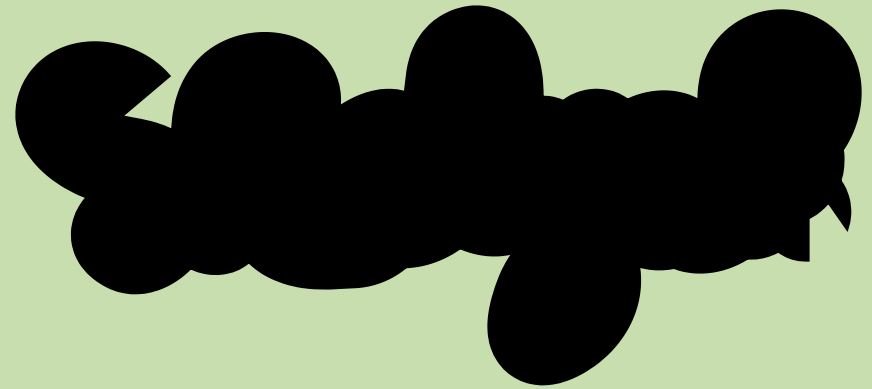


**Which resolution
is better ?
Low or High ?**

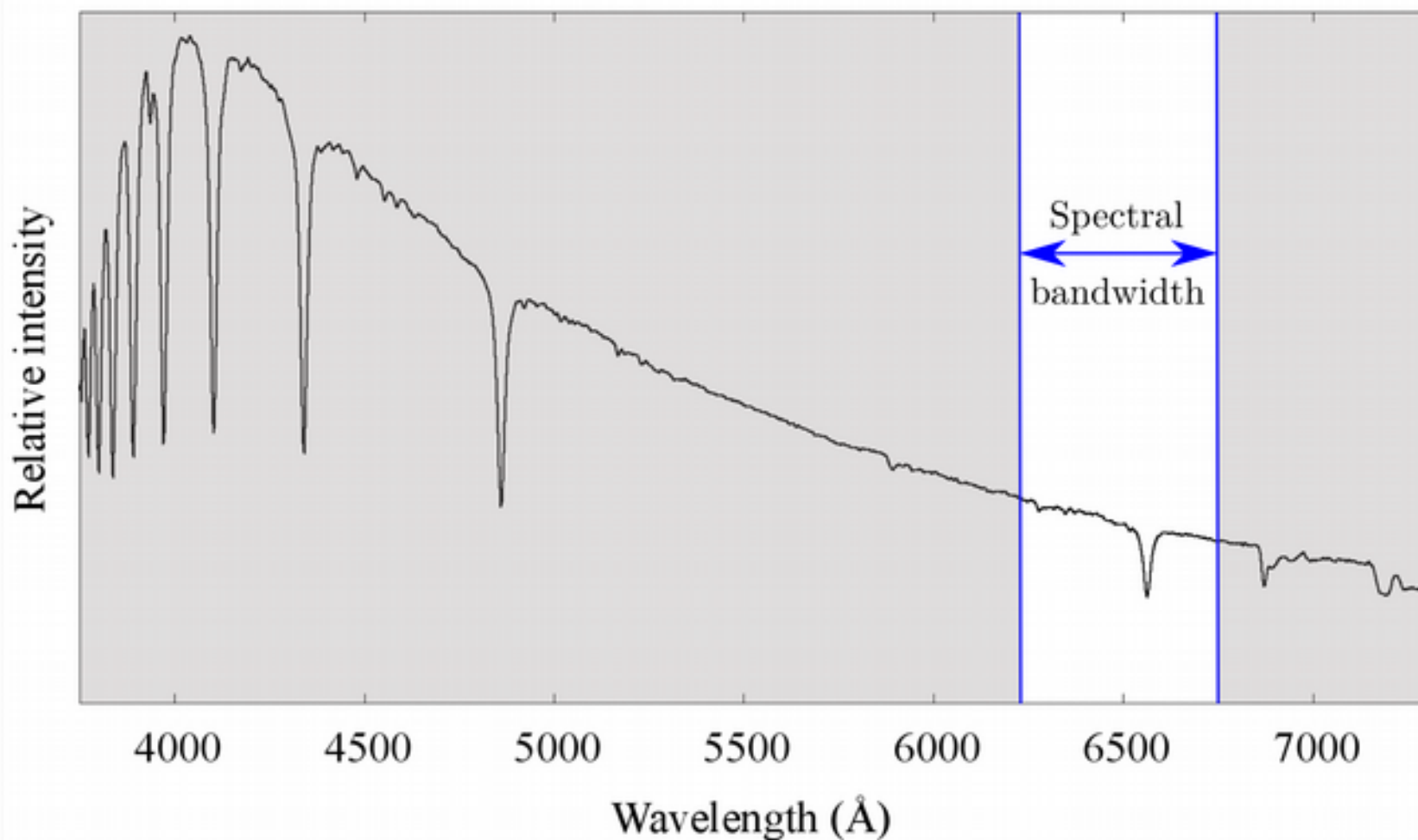
Resolution vs Dispersion



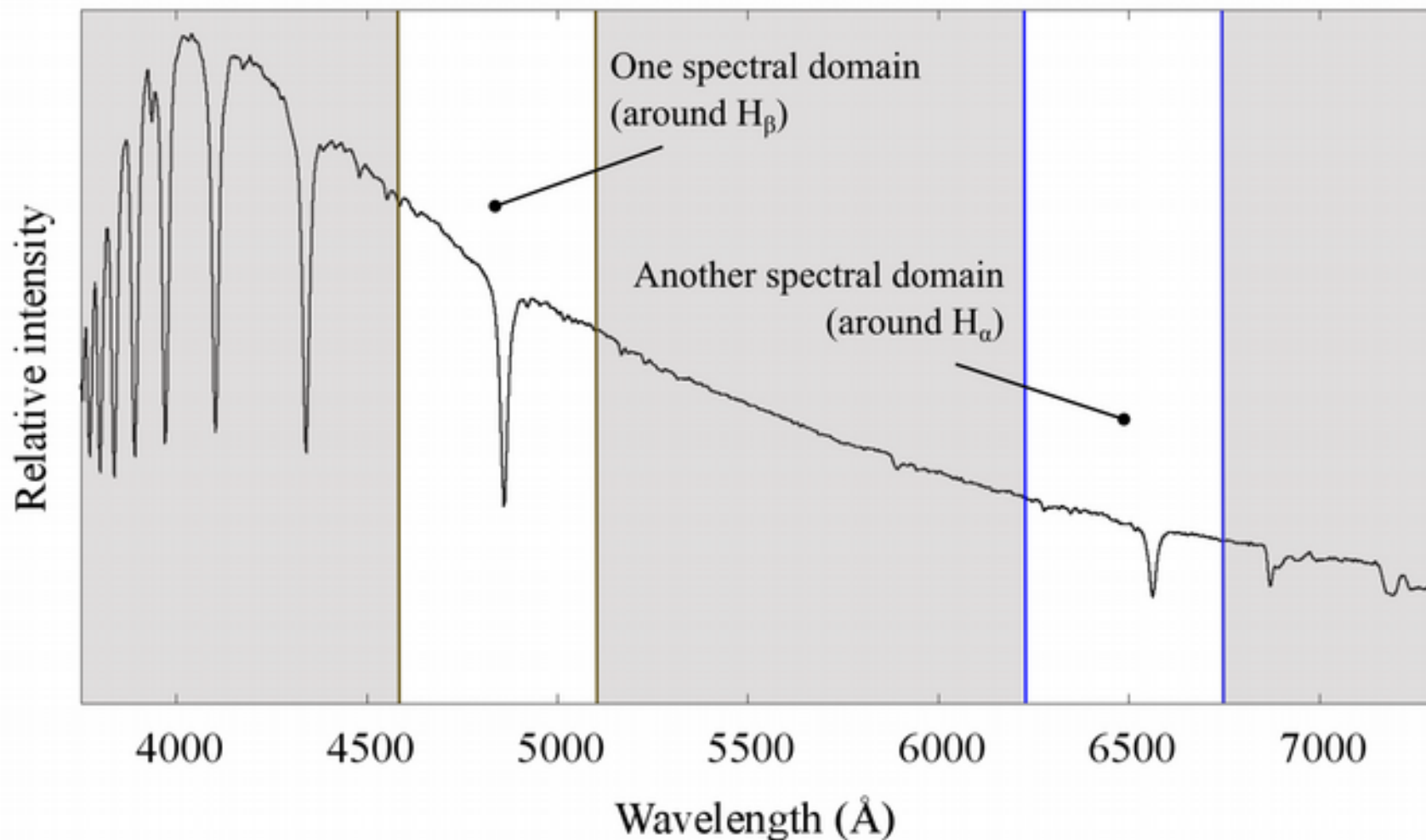
Shelyak



21 Lyn - Apr 18th, 2015 - F. Cochard - Alpy 600 C8 Atik314L+



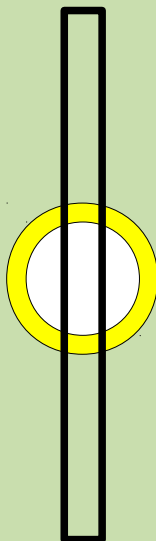
21 Lyn - Apr 18th, 2015 - F. Cochard - Alpy 600 C8 Atik314L+





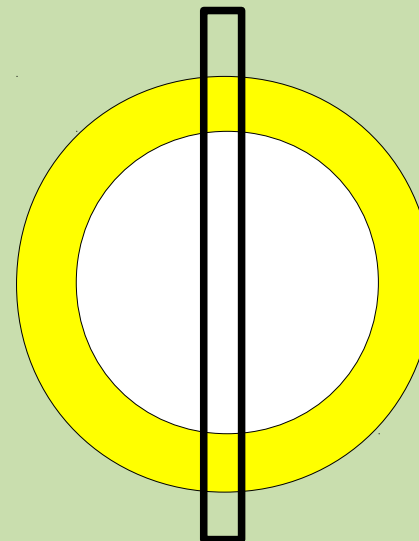
T200mm
F/10

F = 2 m



T600mm
F/10



F = 6 m

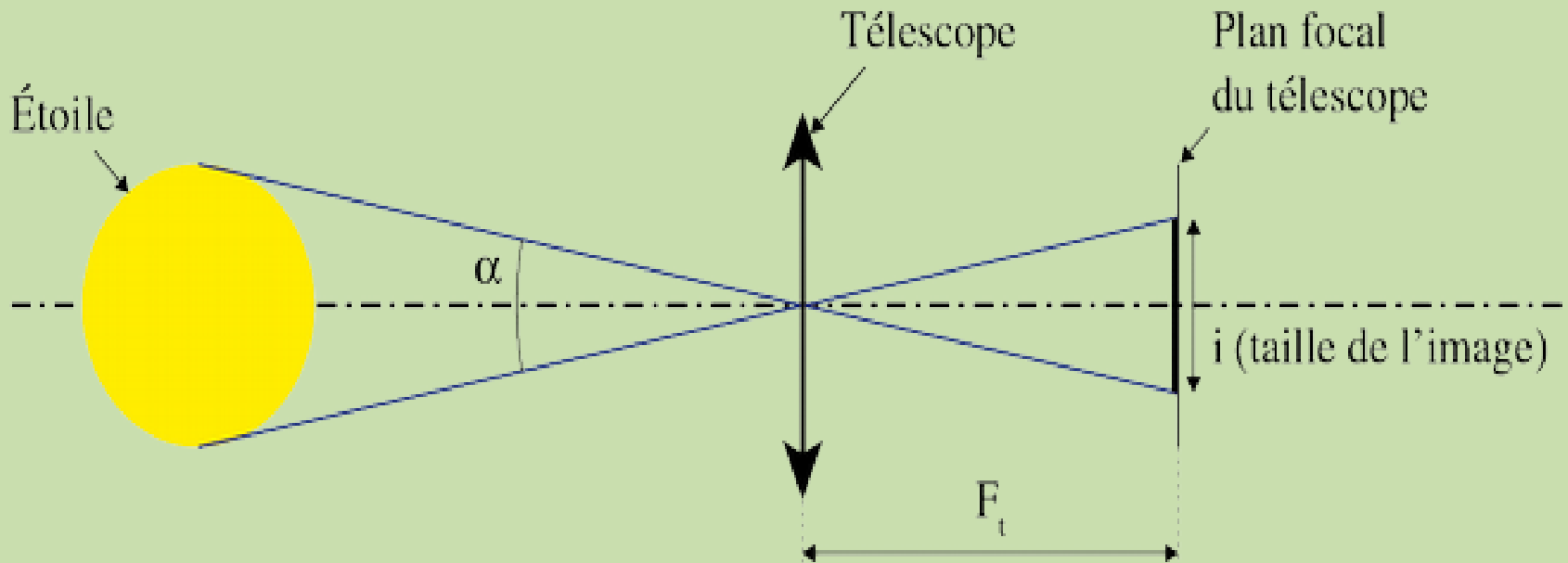


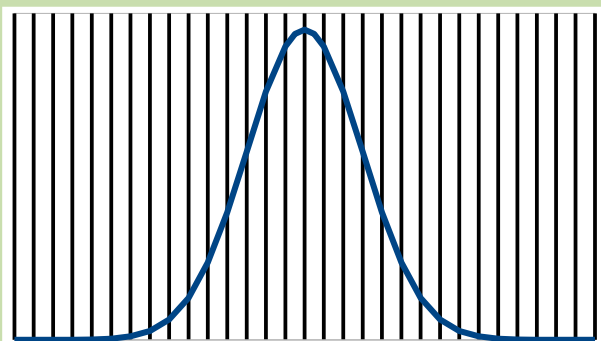
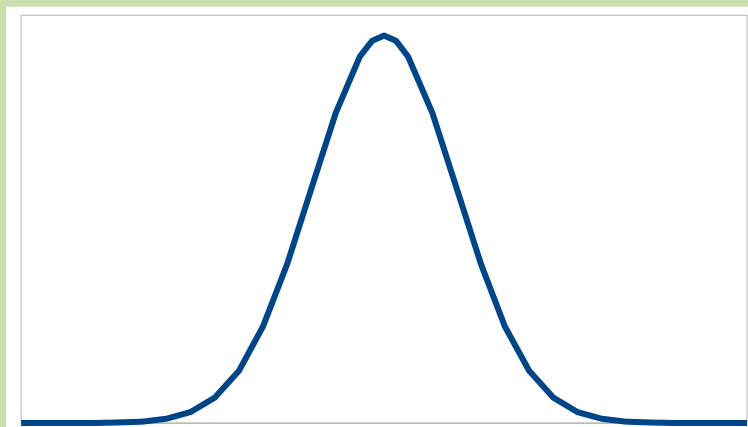
T2000mm
F/10

F = 20 m

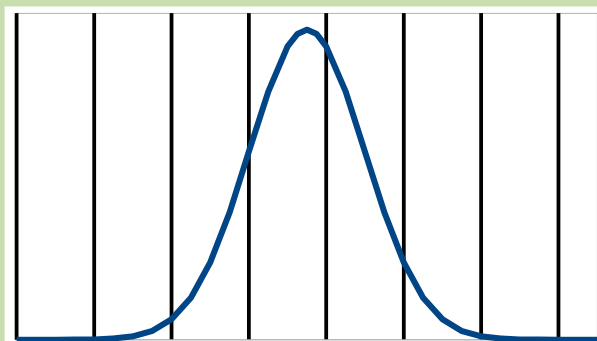
Slit $\sim 20\mu\text{m}$

-  Bon seeing ($\sim 1,5$ arcsec)
-  Mauvais seeing (4 arcsec)

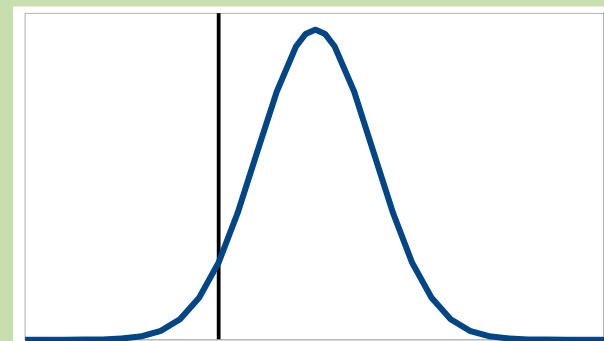




sur-échantillonné

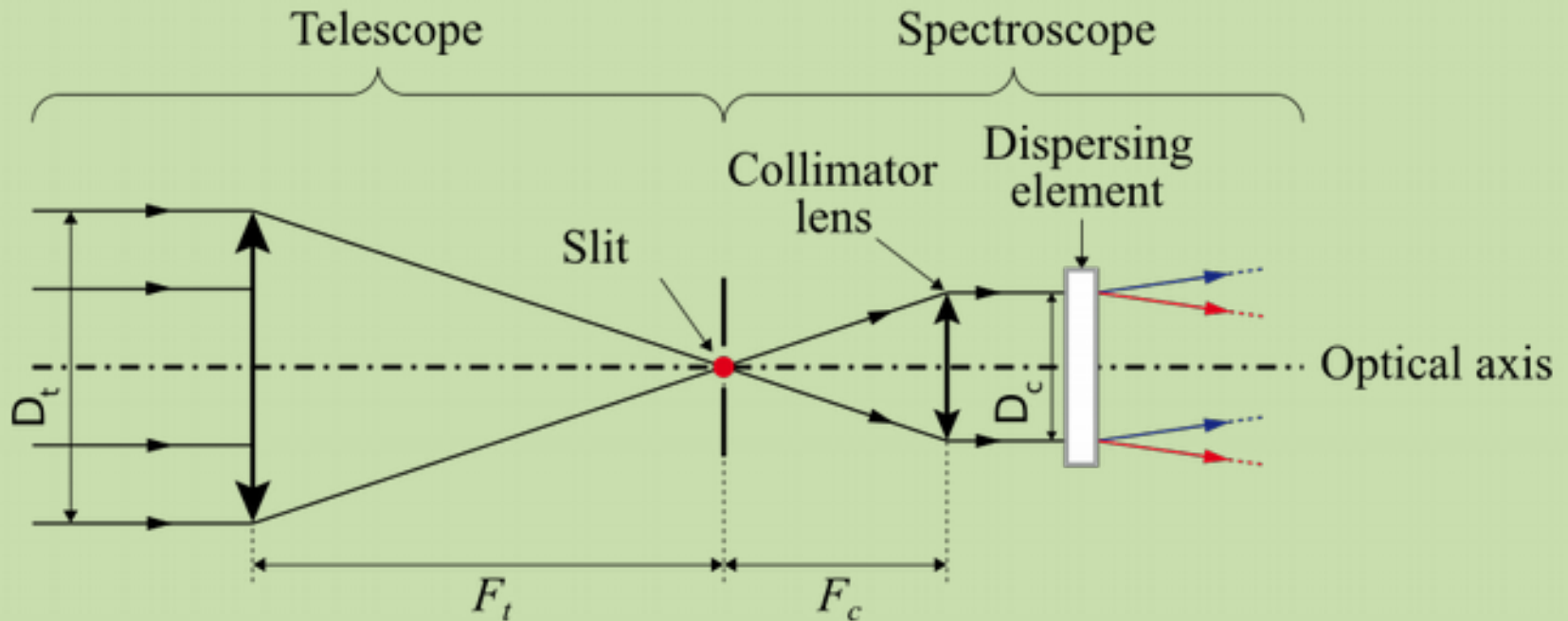


correct

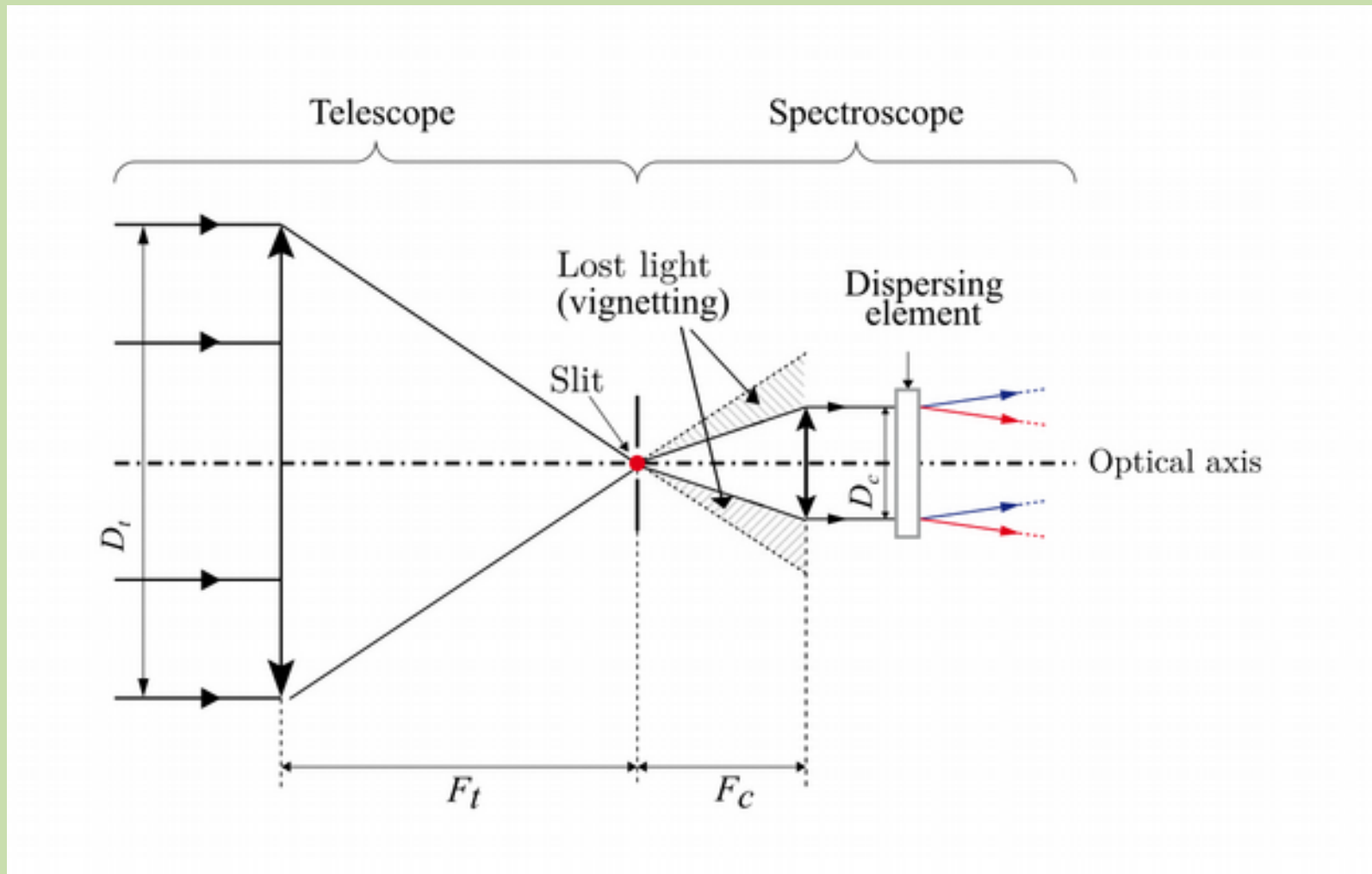


sous-échantillonné

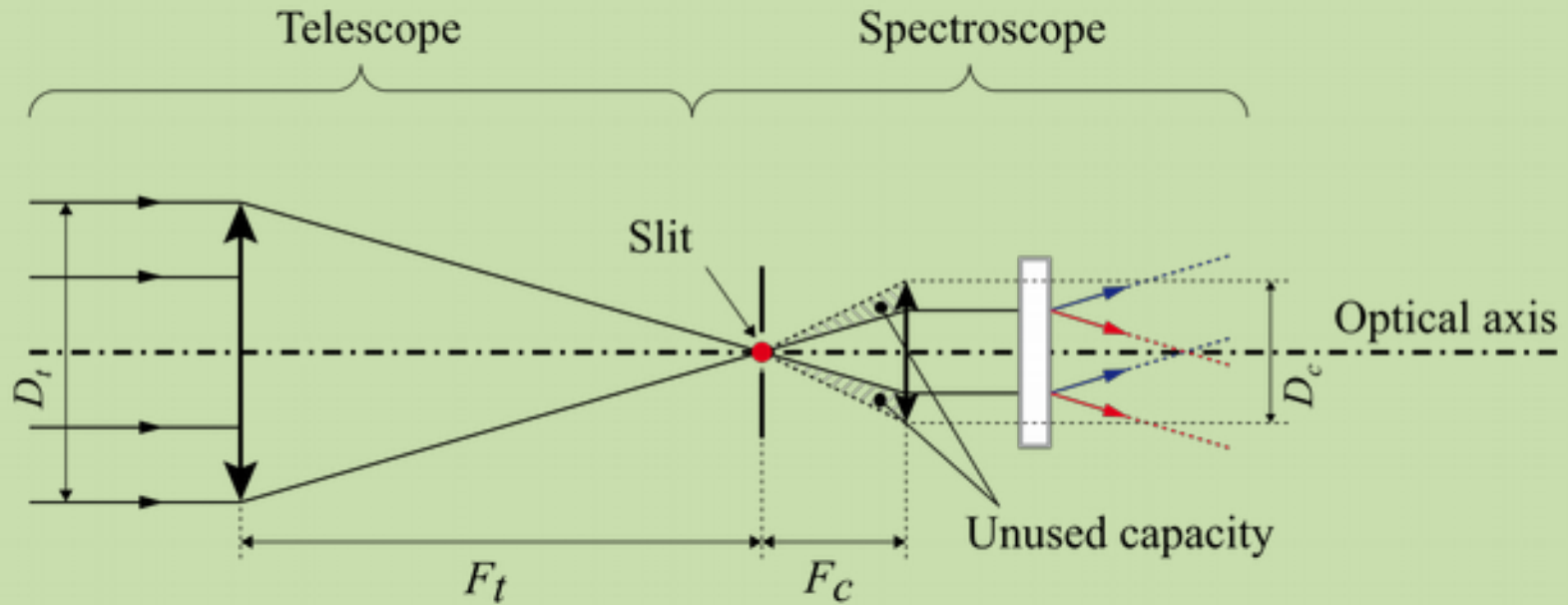
Aperture (F-ratio)



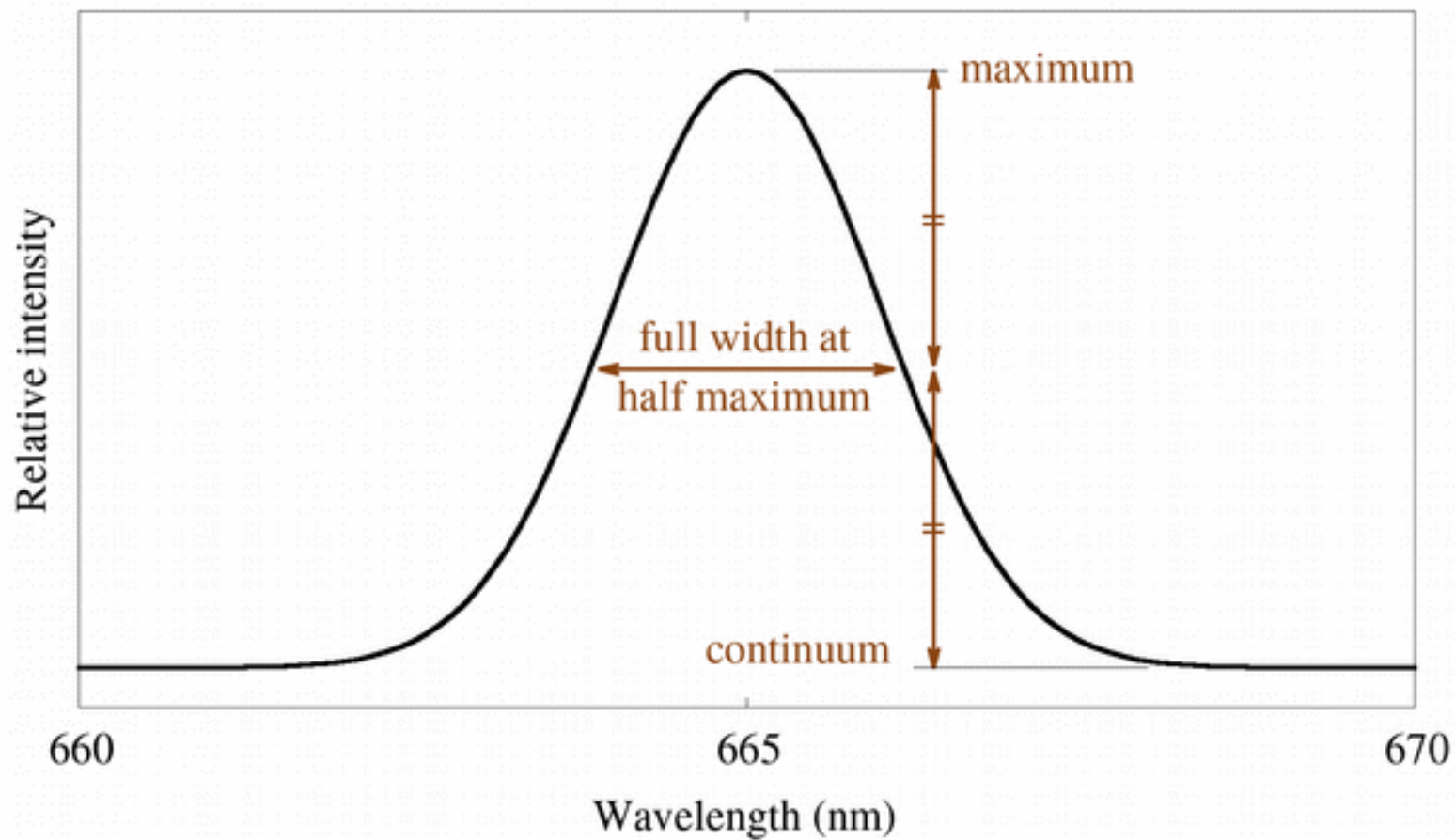
Ouverture F/D (*aperture*)



Ouverture F/D (*aperture*)



FWHM



Flat

A continuous spectrum showing a smooth gradient of colors from violet on the left to red on the right, with no discrete lines.

LED blanche

A spectrum showing a broad, continuous band of light with a slight dip in the blue region, characteristic of a white LED.

Soleil

A continuous spectrum similar to the flat spectrum, but with a noticeable dip in the blue-violet region.

Néon

A dark spectrum with several sharp, vertical emission lines of various colors, including yellow, orange, and red.

Lampe éco

A dark spectrum with several sharp, vertical emission lines, including a prominent yellow-green line and a red line.

Argon néon (étalonnage)

A dark spectrum with several sharp, vertical emission lines, including a prominent yellow-green line and a red line, used for calibration.



Merci !

*Vous ne verrez
plus les étoiles
comme avant !*

Shelyak Instruments

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