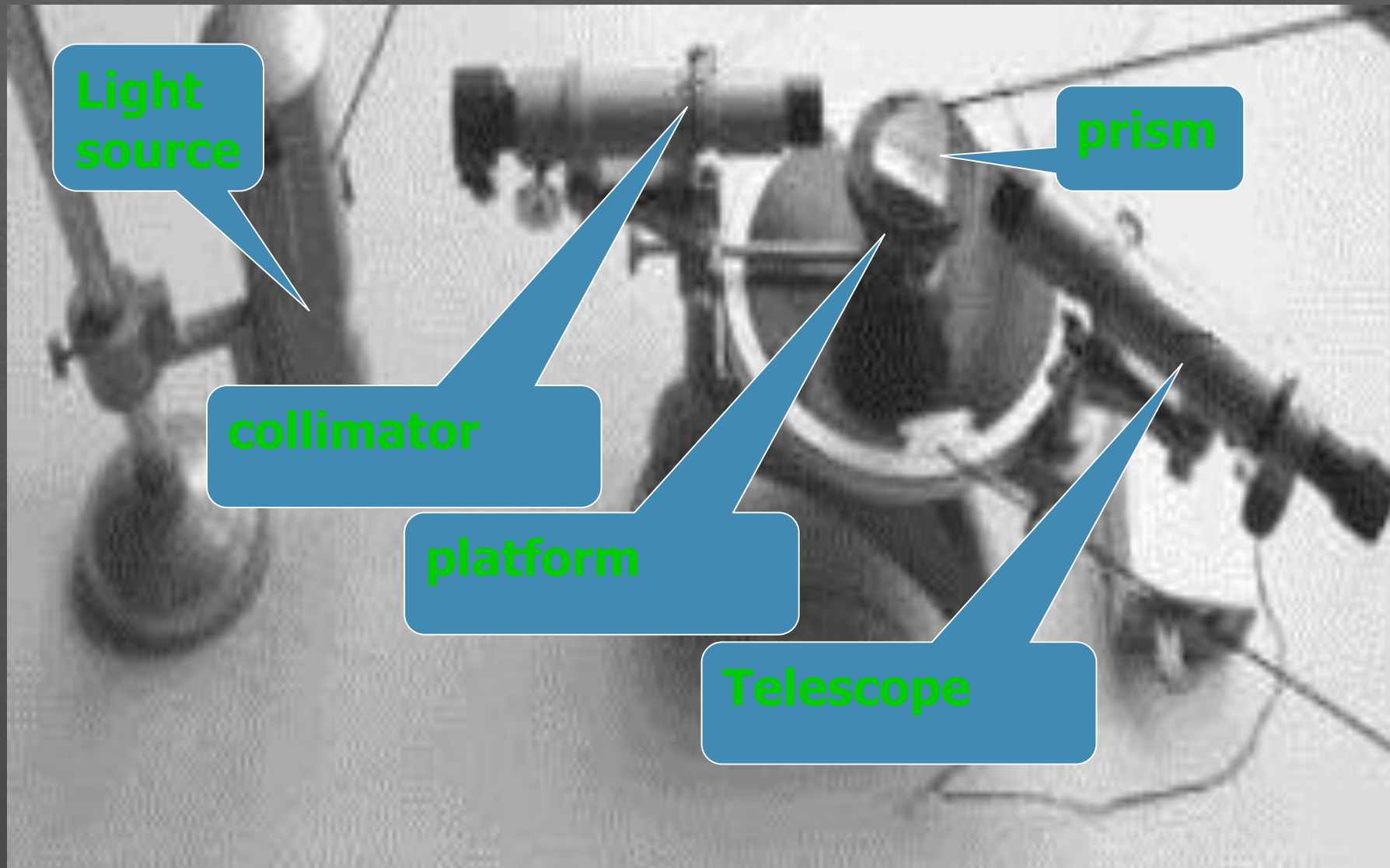# 物理实验教学中心

## Physics Experiment Center
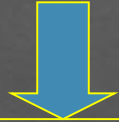
# Spectrometer

Li Bin

NJUPT

# Experimental purposes

1、Master the structure and adjustment of spectrometer.

2、Master the determination of refractive index of prism with the method of minimum deviation angle.

# Instruments

# Adjustments of spectrometer

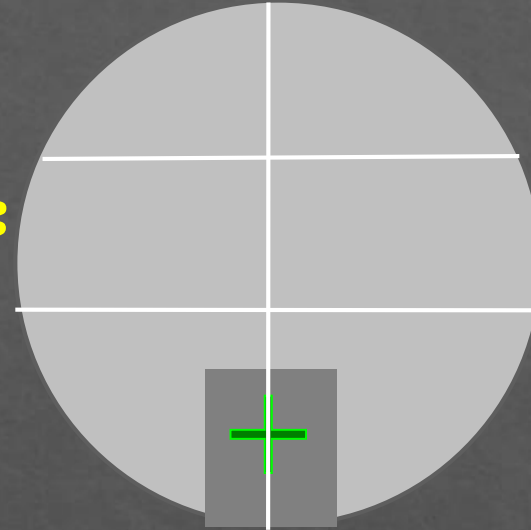Make the telescope focused at infinity

Make the axis of telescope & platform are perpendicular to the center axis

Make the axis of collimator are perpendicular to the center axis

# Telescope

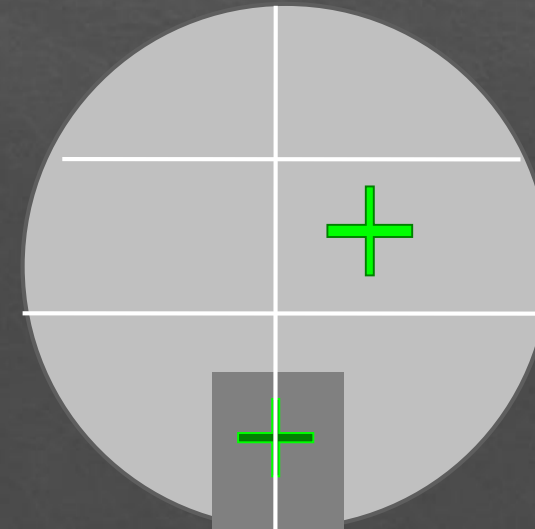❖**Eyepiece (eye lens) focusing：**

❖**Objective lens focusing：**

Make the double-faced mirror attached to the objective lens，move the eyepiece sleeve, then tighten the locking screw.
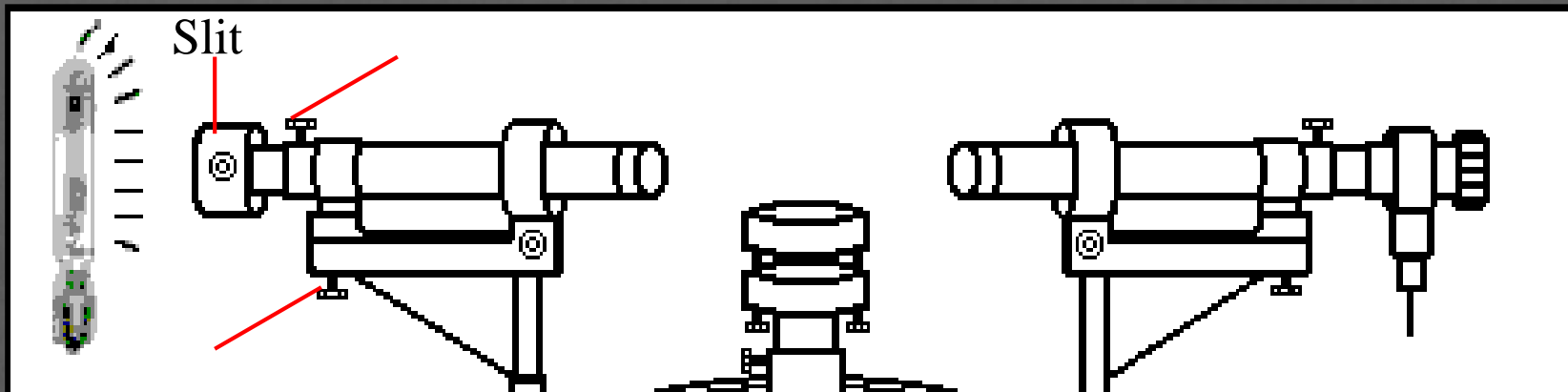
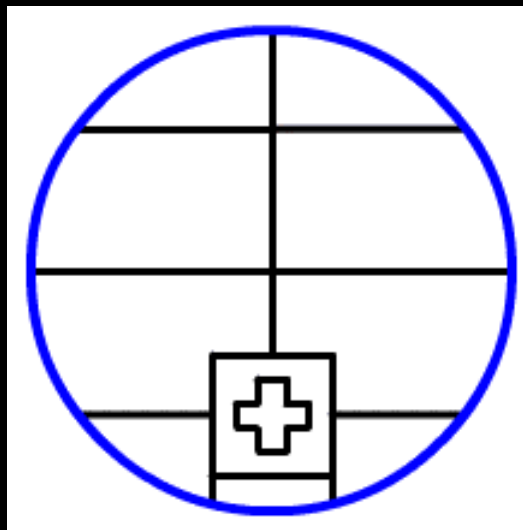# Vertical adjustment

➢Final vision：see right

➢**Method**：

❖Three adjusting screw button under the loading platform

❖The telescope elevation adjusting screw

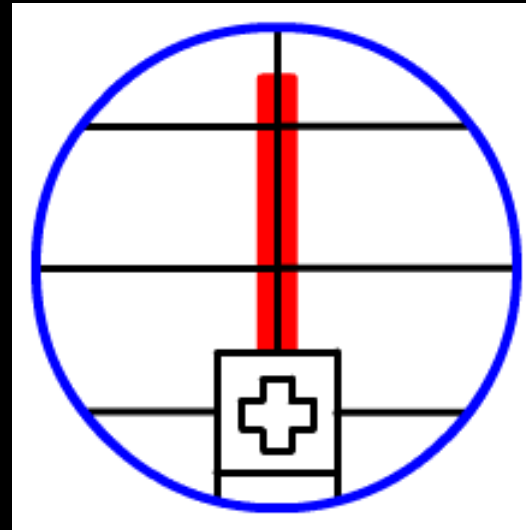➢Steps：

❖Coarse adjustment

❖Fine ajustment

# collimator
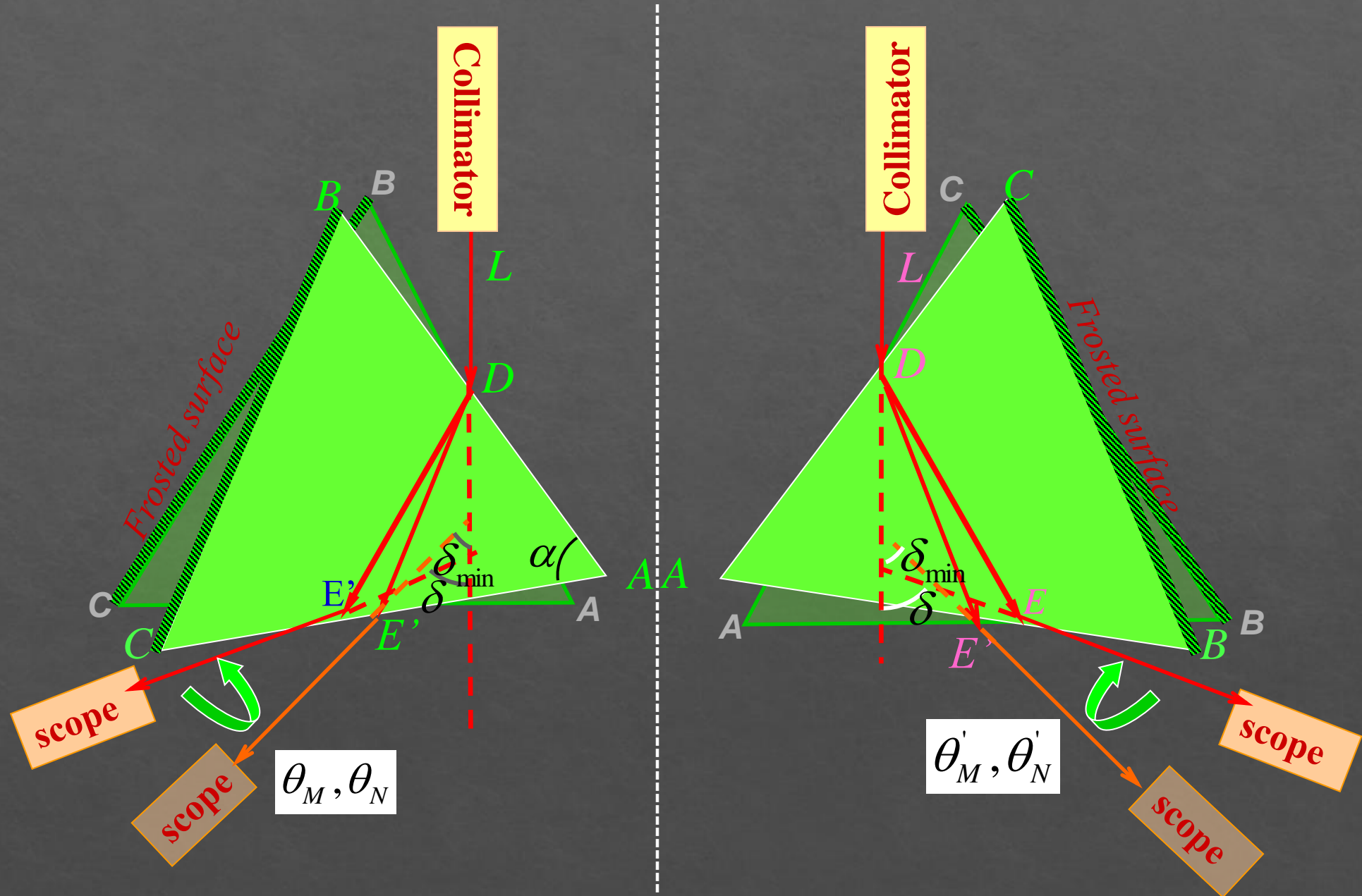


Slit
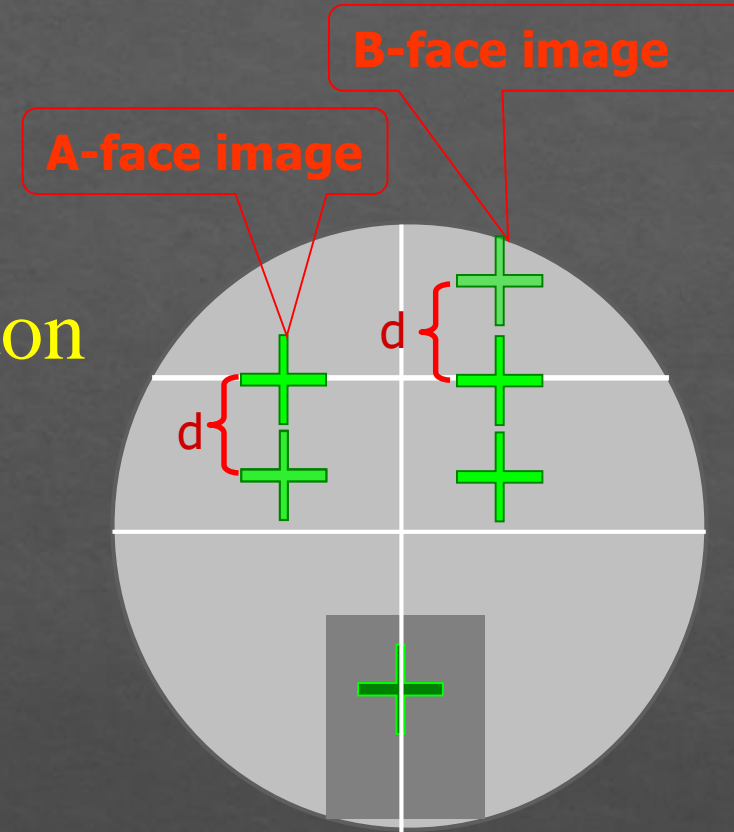
# Minimum deviation angle

**Calculate minimum deviation angle :**

$$\delta_{\min} = \frac{1}{4}[|\theta'_M - \theta_M| + |\theta'_N - \theta_N|]$$

So we just need to measure four angles:

$\theta_M$ $\theta'_M$ $\theta_N$ $\theta'_N$

# Reading system



Vernier

$\theta_M$  $\theta_N$

Main dial

游标尺

0    10    20    30

230    240    250

主刻度盘

**233 °13´**  Main dial + Vernier

# Refractive index of prism

$$n = \frac{\sin \dfrac{\delta_{\min} + \alpha}{2}}{\sin \dfrac{\alpha}{2}}$$

α = $60^0$

# Data

➢**Table**

| NO.＼Angle | $\theta_M$ | $\theta_N$ | $\theta_M{}'$ | $\theta_N{}'$ | $\theta_M - \theta_M{}'$ | $\theta_N - \theta_N{}'$ | $\delta_{min}=[(\theta_M - \theta_M{}')+(\theta_N - \theta_N{}')]/4$ | $\delta_{min}$ |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

END