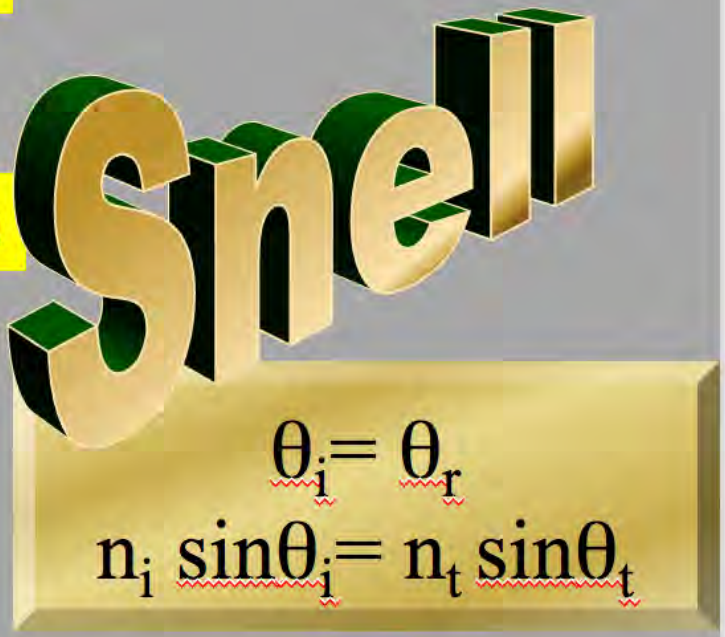
$$\frac{1}{p}-\frac{1}{q}=-\frac{2}{R}=-\frac{1}{f}$$ specchio

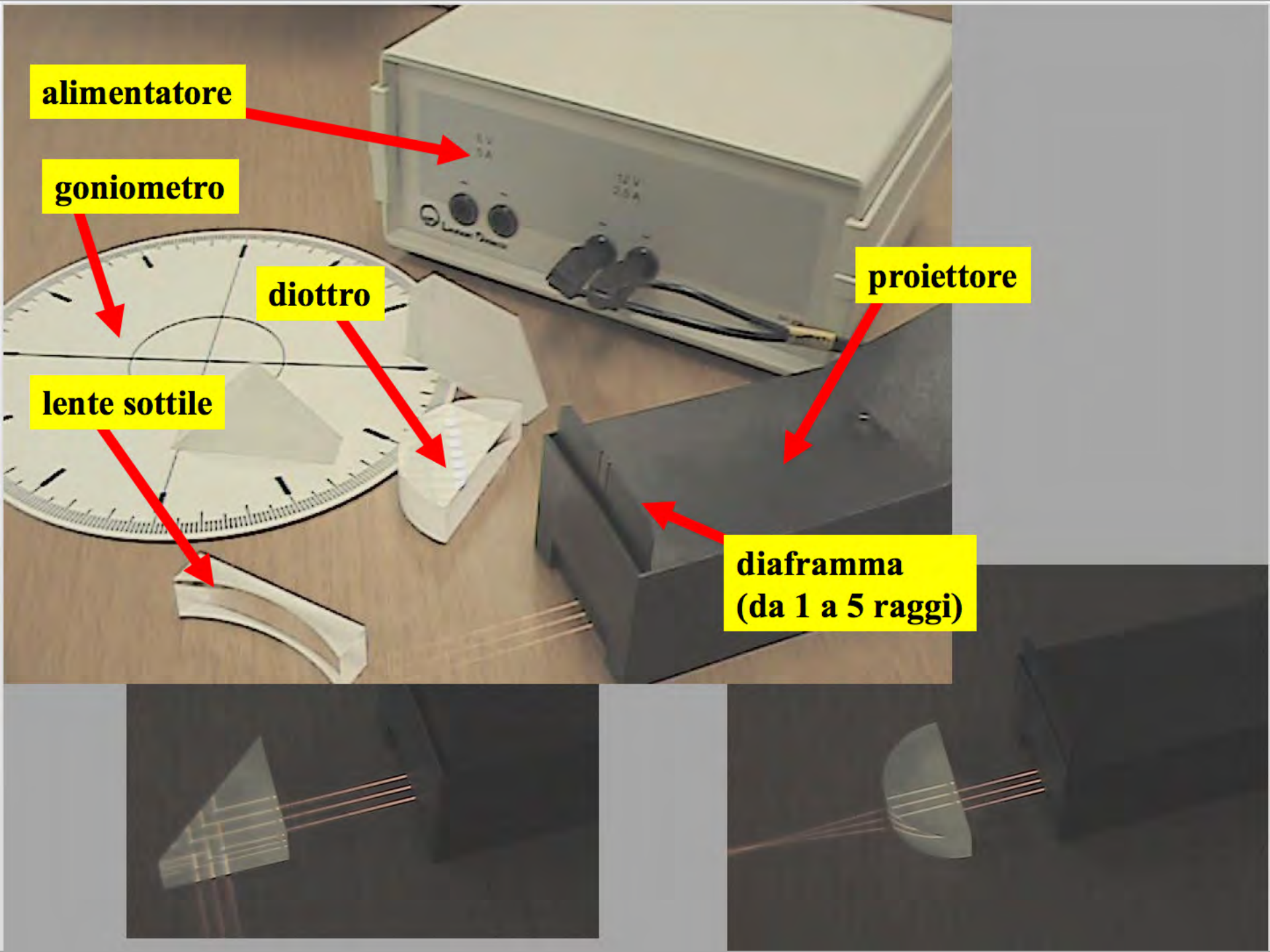
$$1/n=\sin\theta_L$$ angolo limite in aria

$$\frac{1}{p}+\frac{1}{q}=\frac{1}{f}$$ lente sottile in aria

$$\frac{1}{f}=(n-1)\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$$

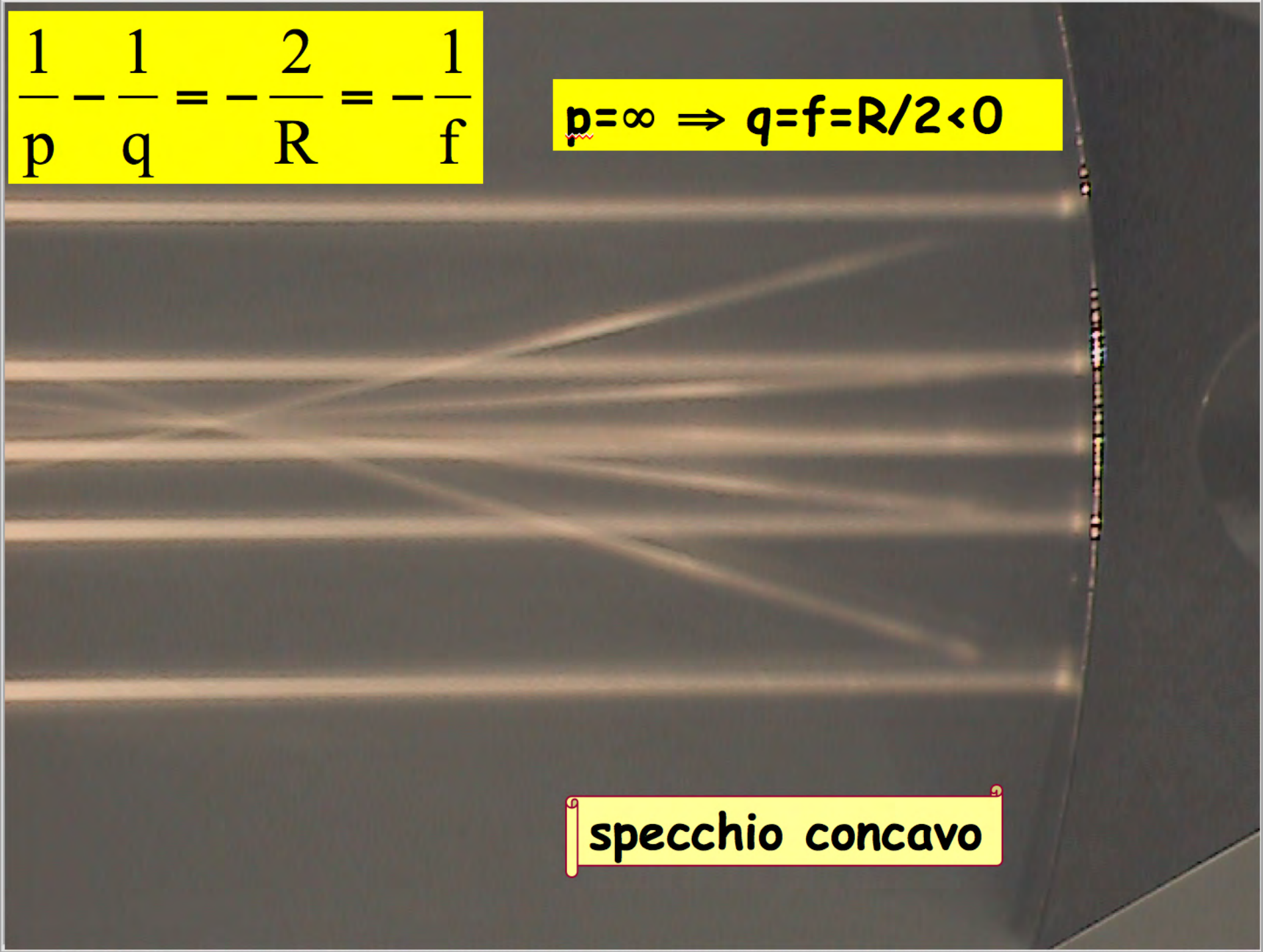
$$\frac{1}{f}=\frac{1}{f_1}+\frac{1}{f_2}$$ lenti sottili accoppiate




alimentatore
goniometro
diottro
lente sottile
proiettore
diaframma
(da 1 a 5 raggi)

$$\frac{1}{p} - \frac{1}{q} = -\frac{2}{R} = -\frac{1}{f}$$

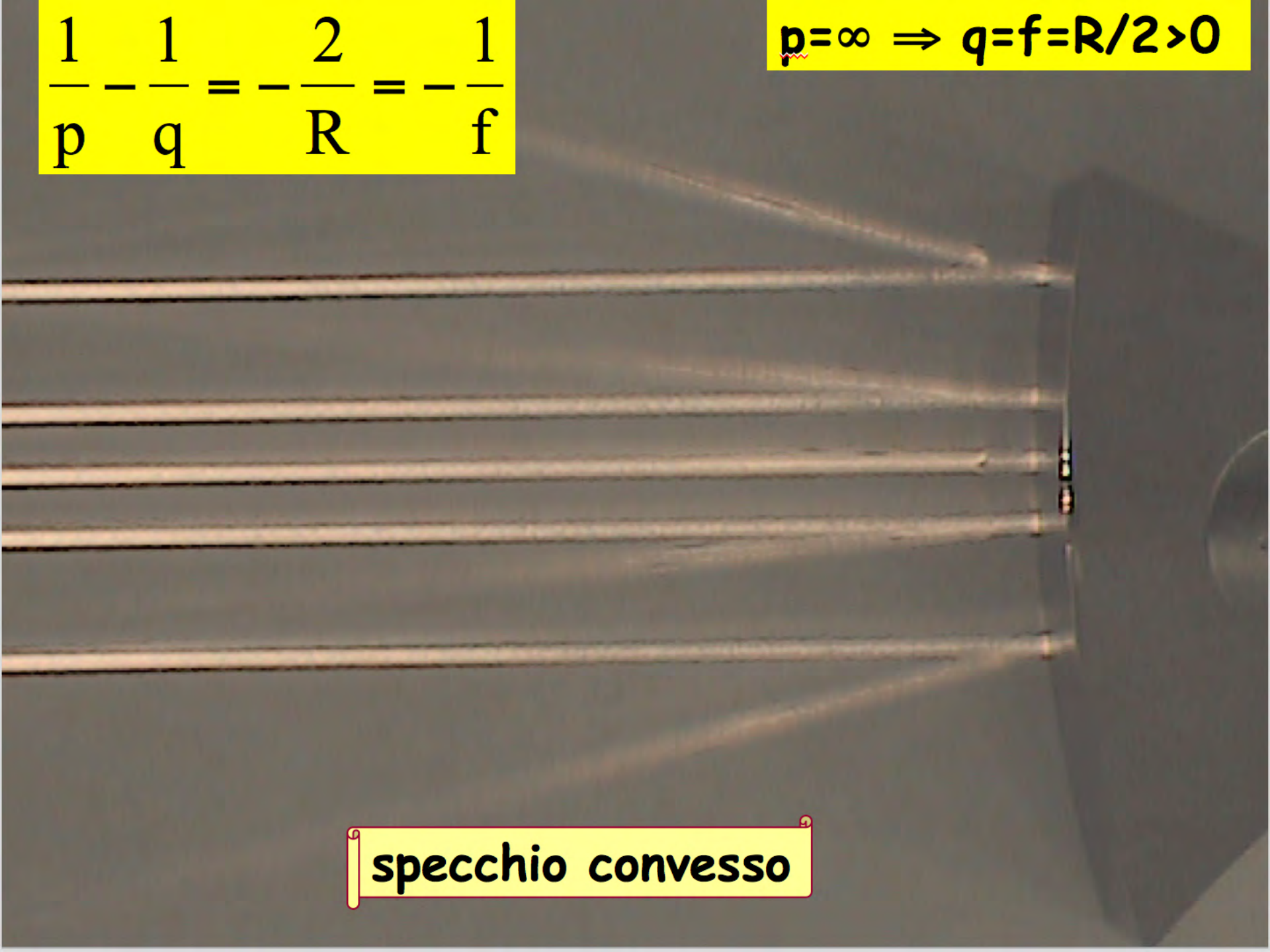
$p=\infty \Rightarrow q=f=R/2<0$



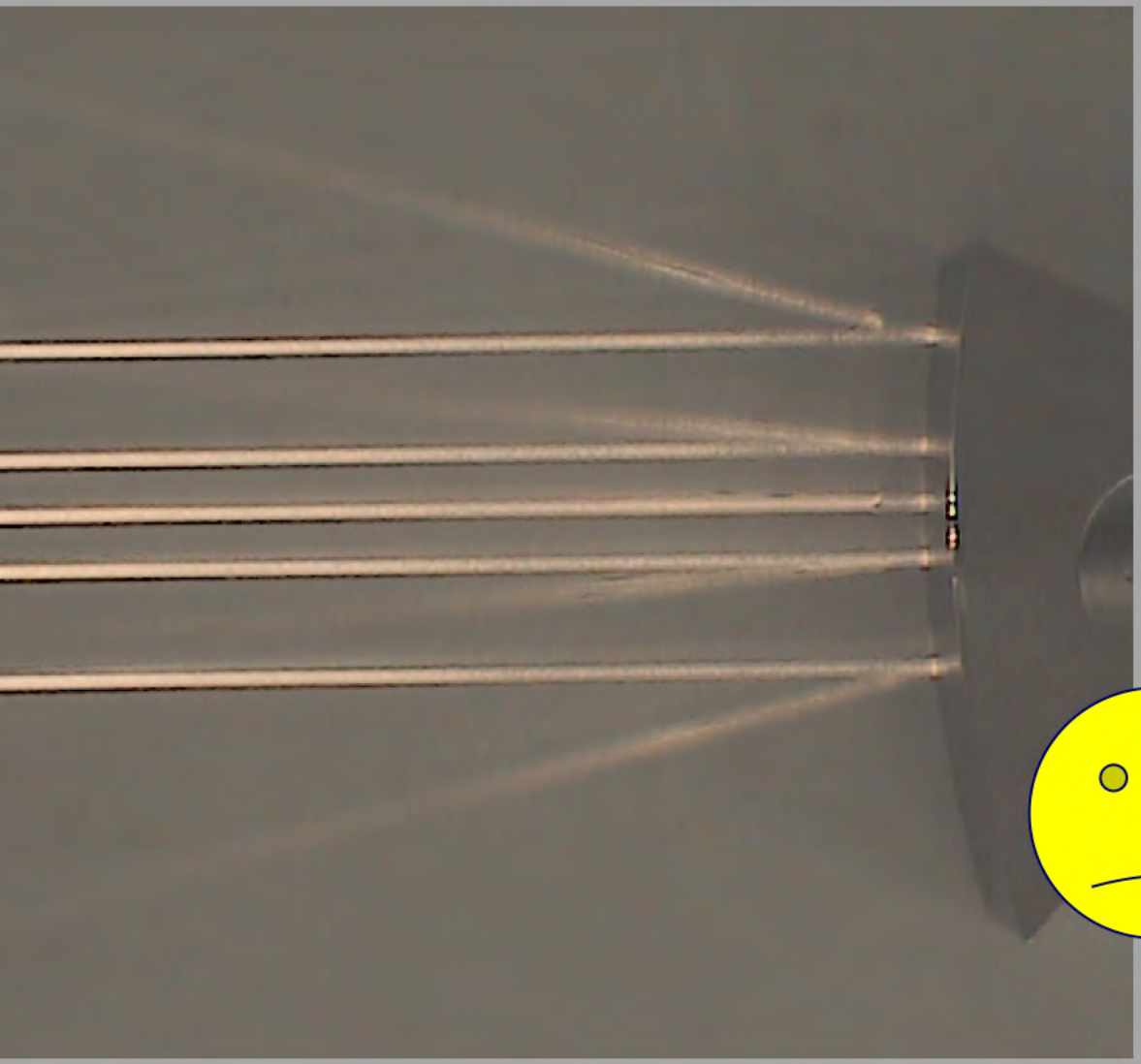
specchio concavo

$$\frac{1}{p}-\frac{1}{q}=-\frac{2}{R}=-\frac{1}{f}$$

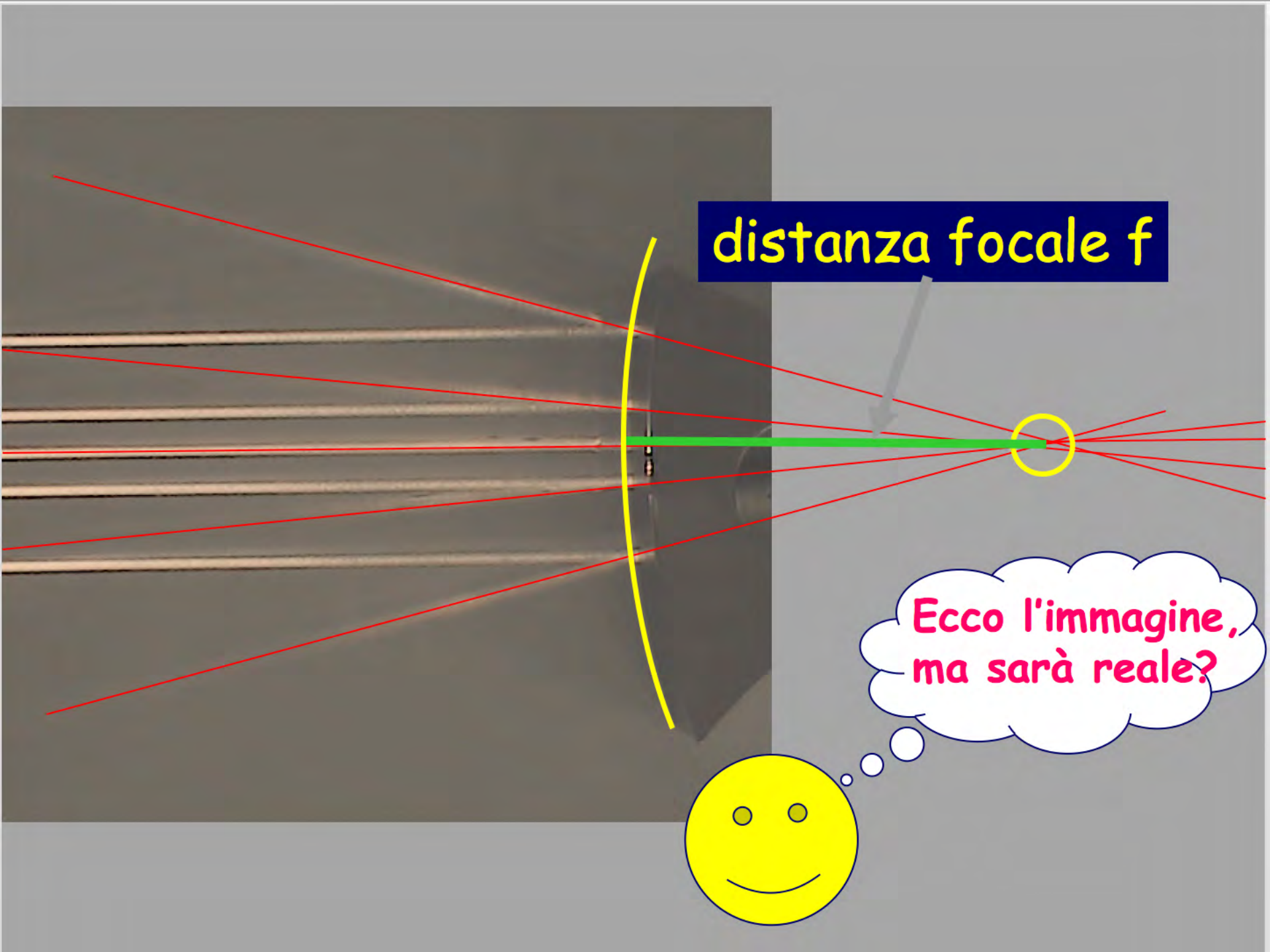
$p=\infty \Rightarrow q=f=R/2>0$



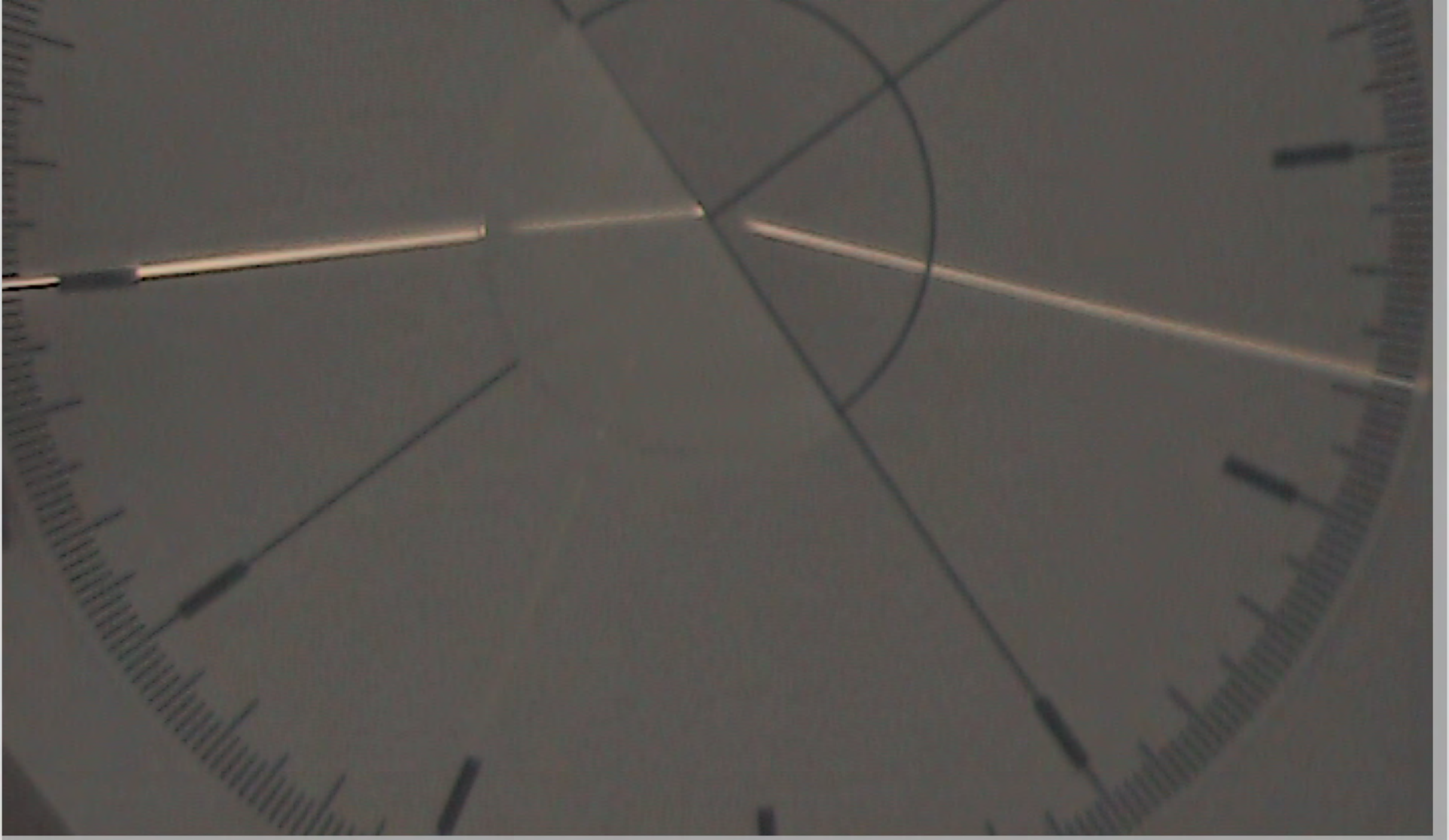
specchio convesso

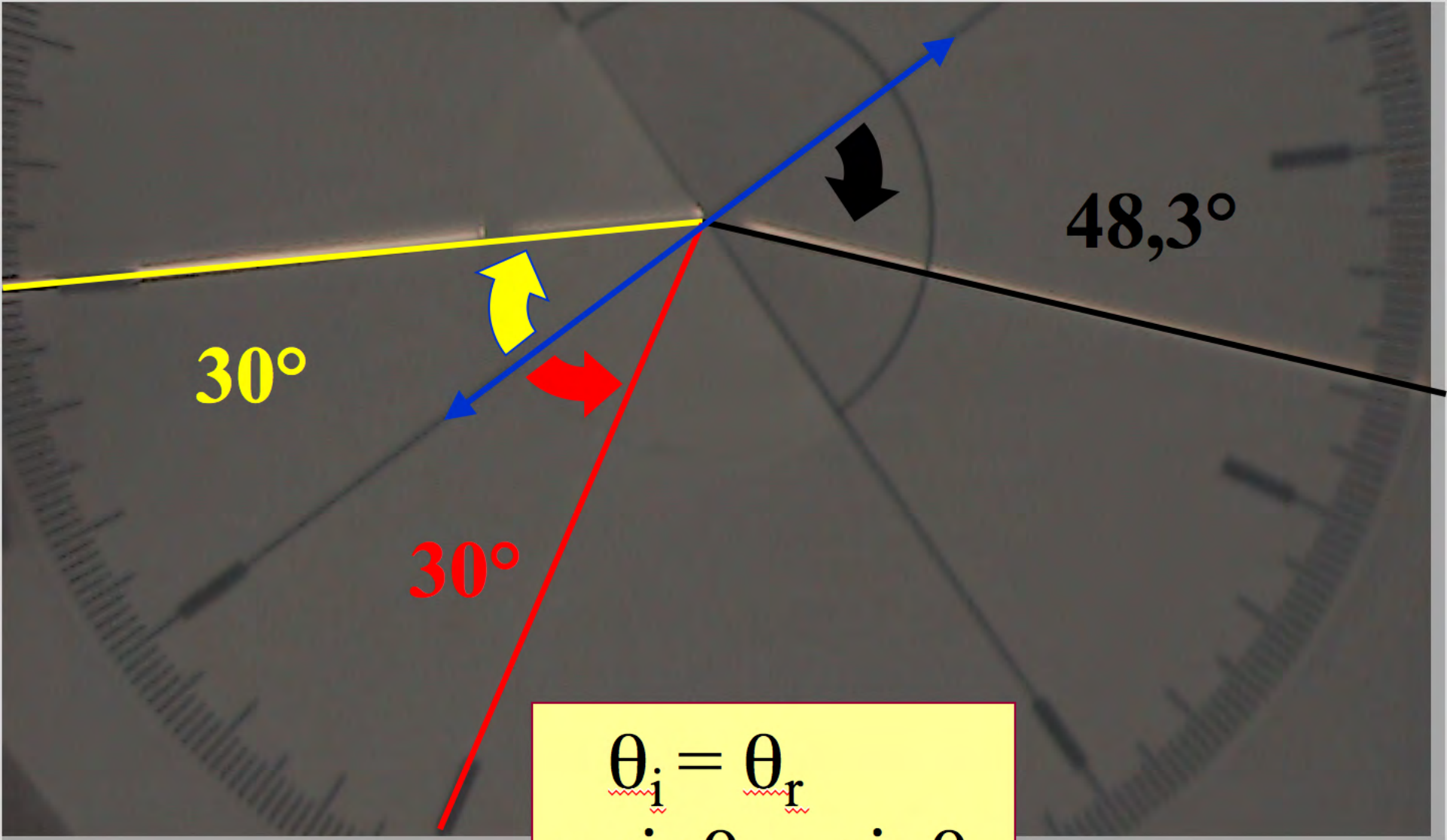


Chissà dov'è finita l'immagine ...


distanza focale f
Ecco l'immagine,
ma sarà reale?

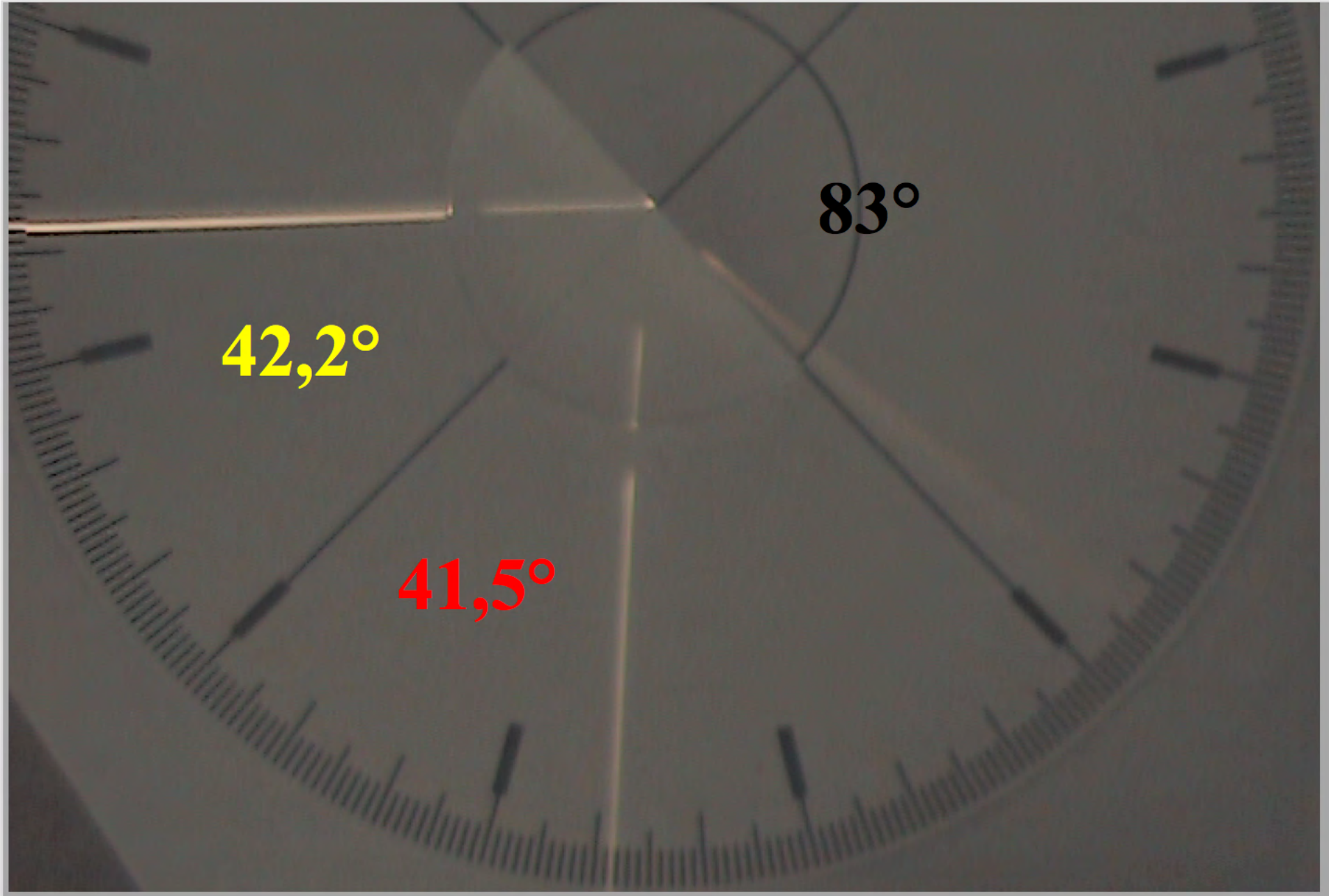
Riflessione totale e angolo limite





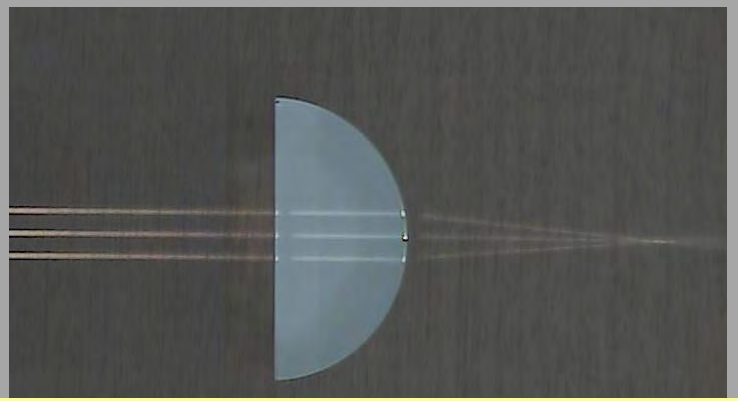
$$\theta_i = \theta_r$$

$$n \sin\theta_i = \sin\theta_t$$


83°
42,2°
41,5°

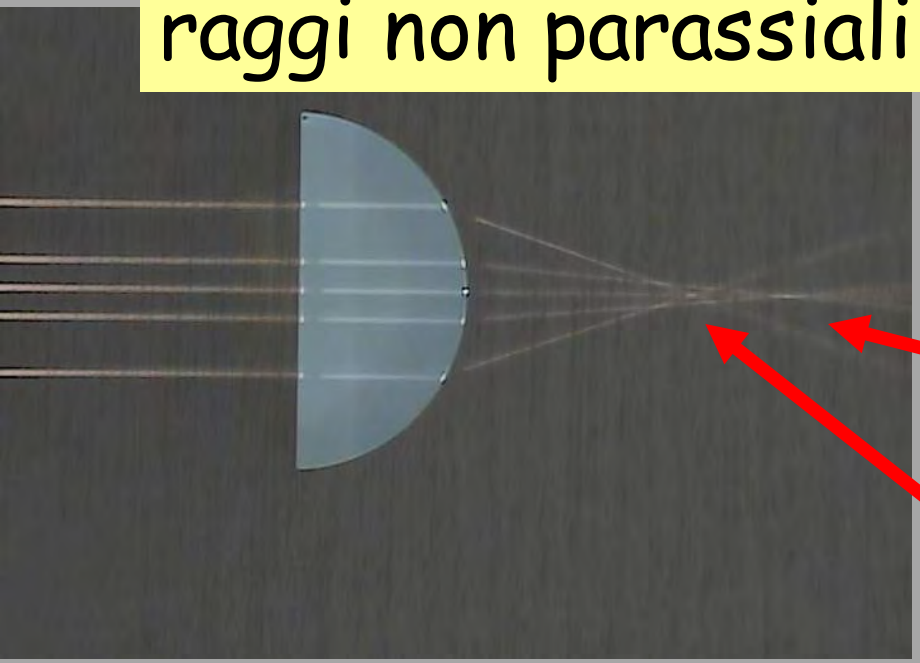

$1/n = \sin \theta_L$
50°
50°
È sparito il raggio rifratto … che fine ha fatto la sua energia ?

il diottro



raggi parassiali:
sistema stigmatico

raggi non parassiali



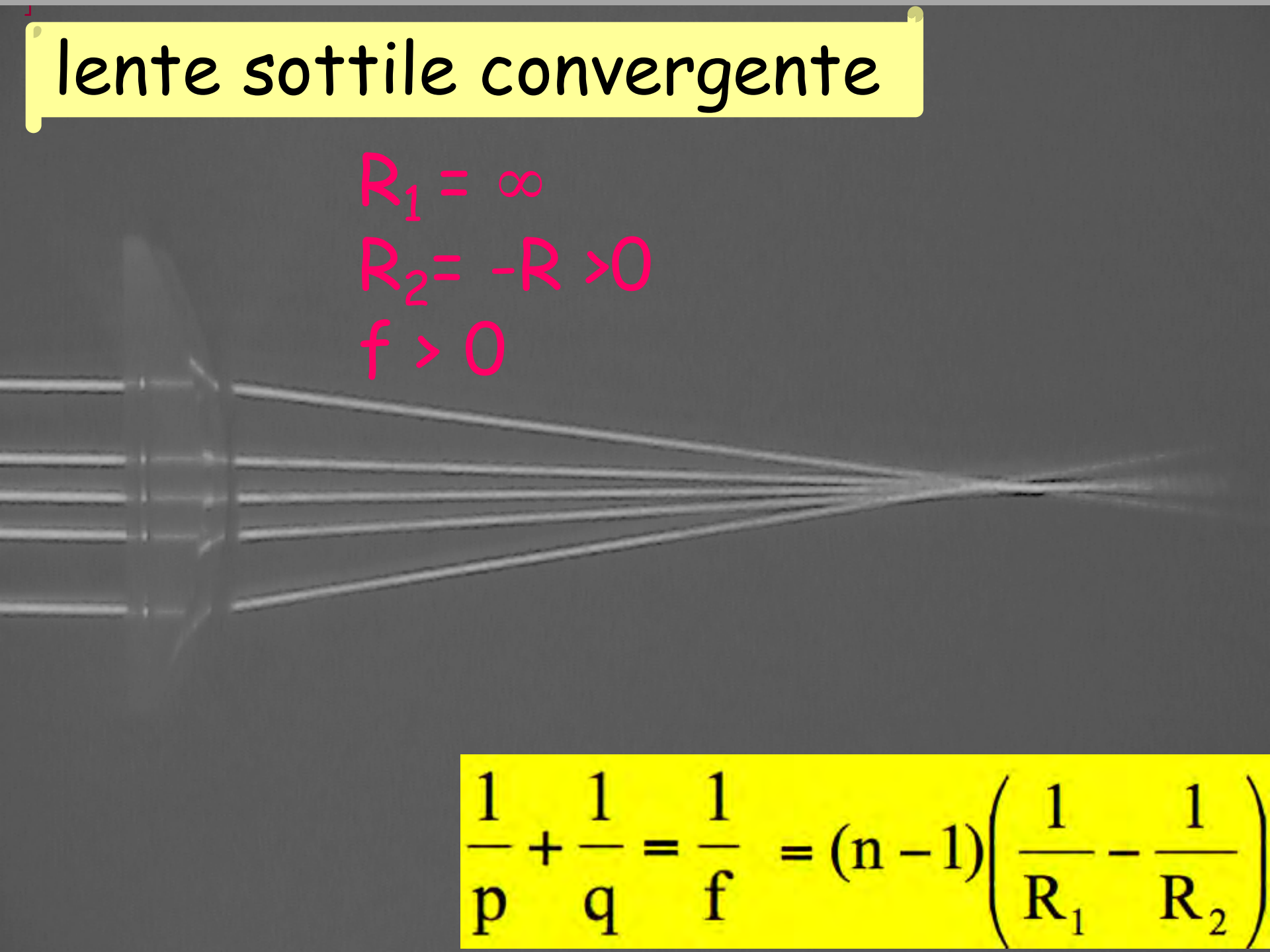
aberrazione ottica:
sistema non stigmatico

lente sottile convergente

$R_1 = \infty$

$R_2 = -R > 0$

$f > 0$



$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

lente sottile divergente

$R_1 = \infty$

$R_2 = R > 0$

$f < 0$

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

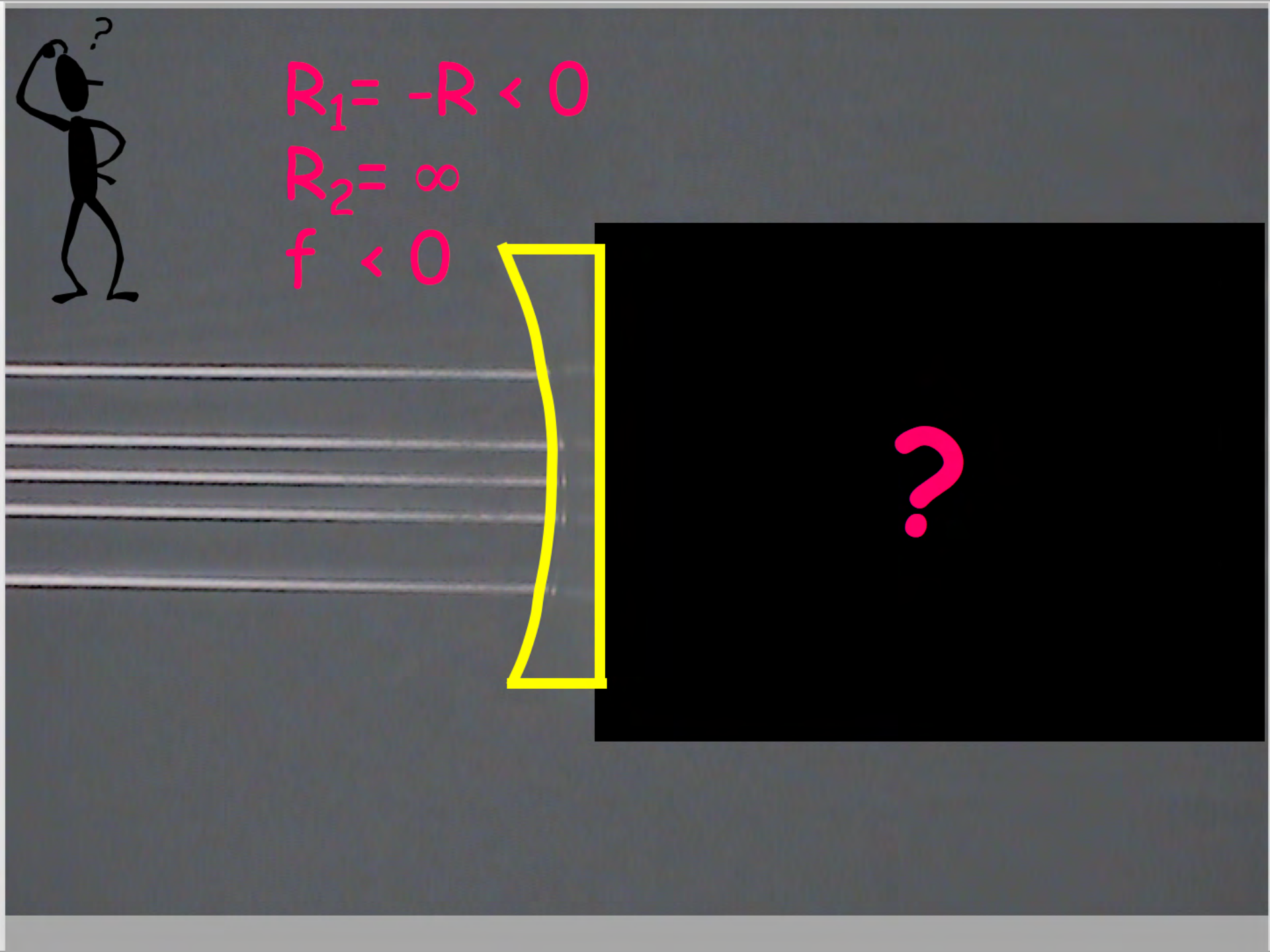
lente sottile divergente

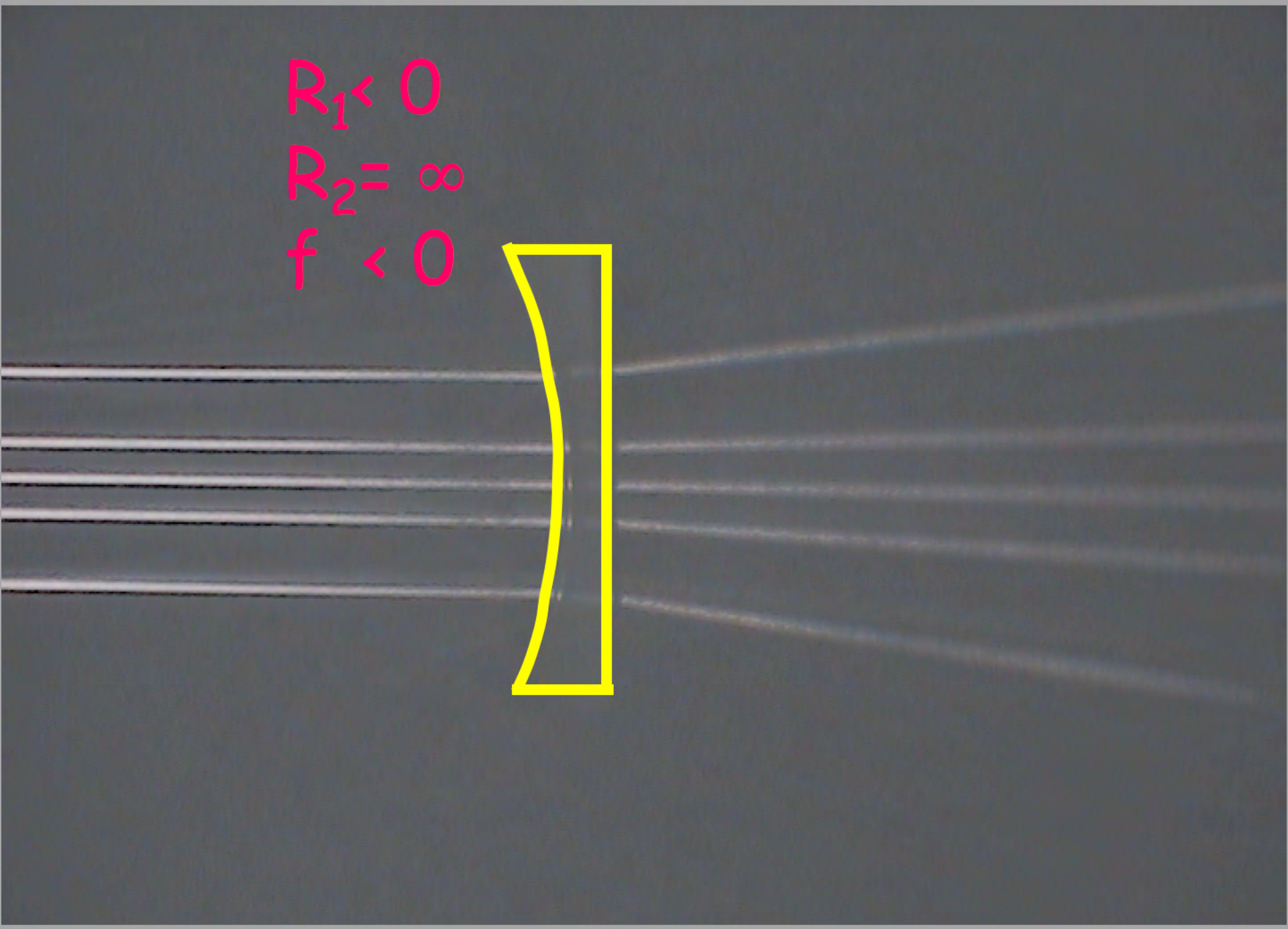
$R_1 = \infty$

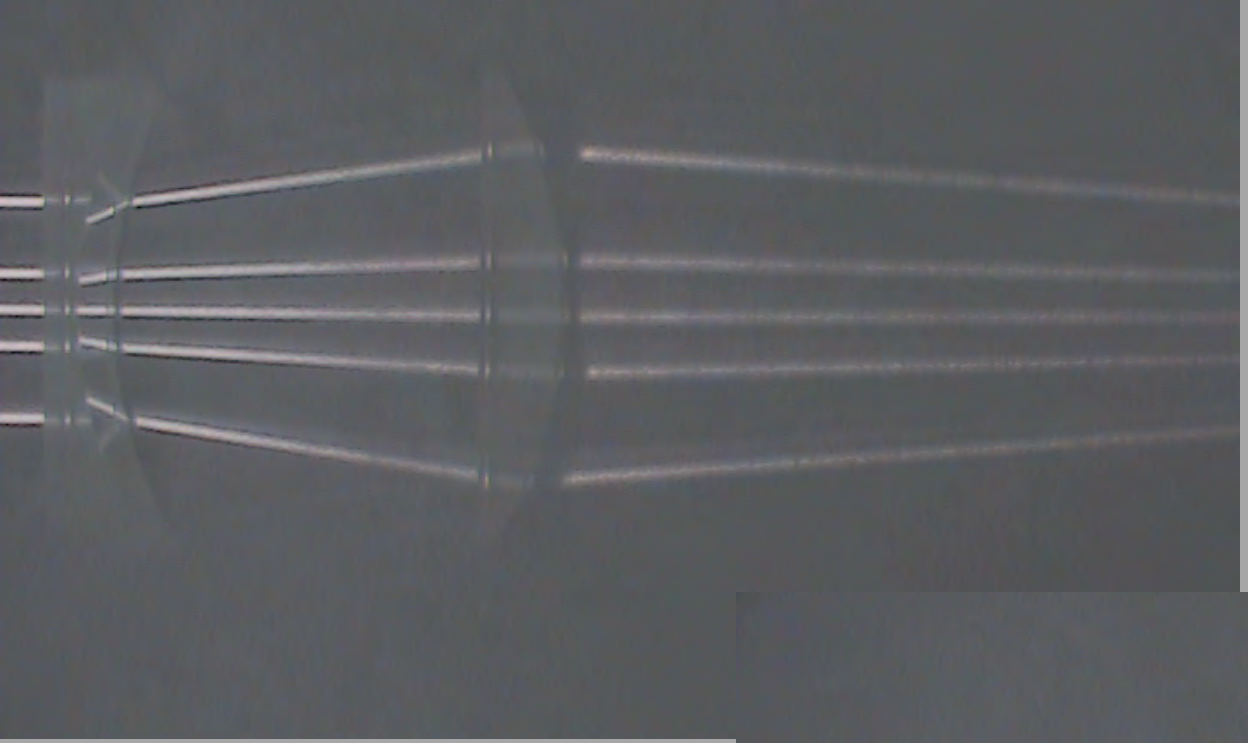
$R_2 = R > 0$

$f < 0$

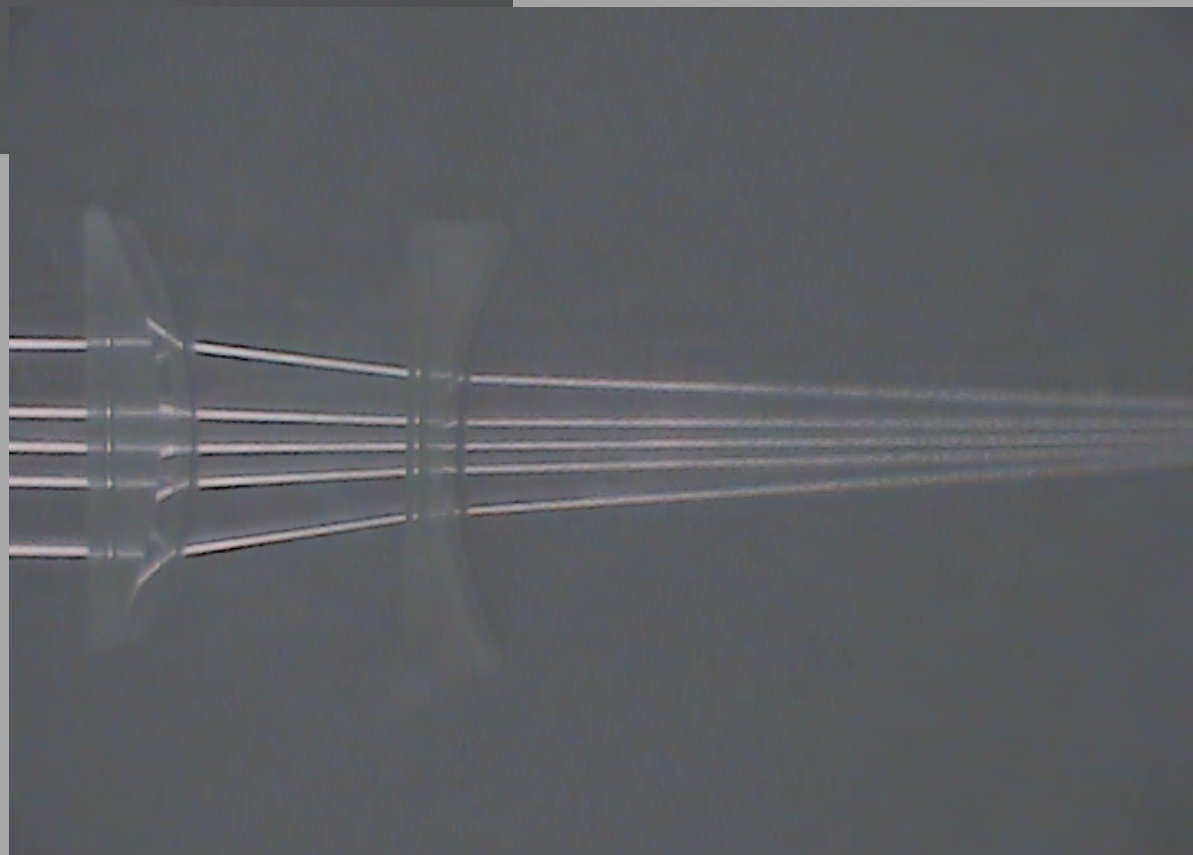
$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$


$R_1 = -R < 0$
$R_2 = \infty$
$f < 0$
?


$R_1 < 0$
$R_2 = \infty$
$f < 0$



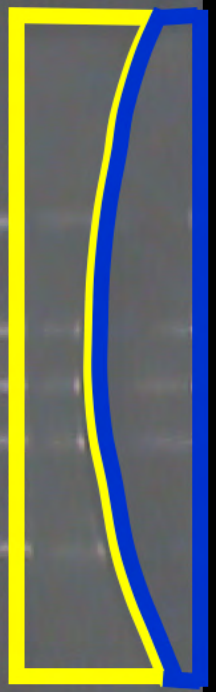
$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$$



$R_1 = \infty$

$R_2 = \infty$

$f = \infty$

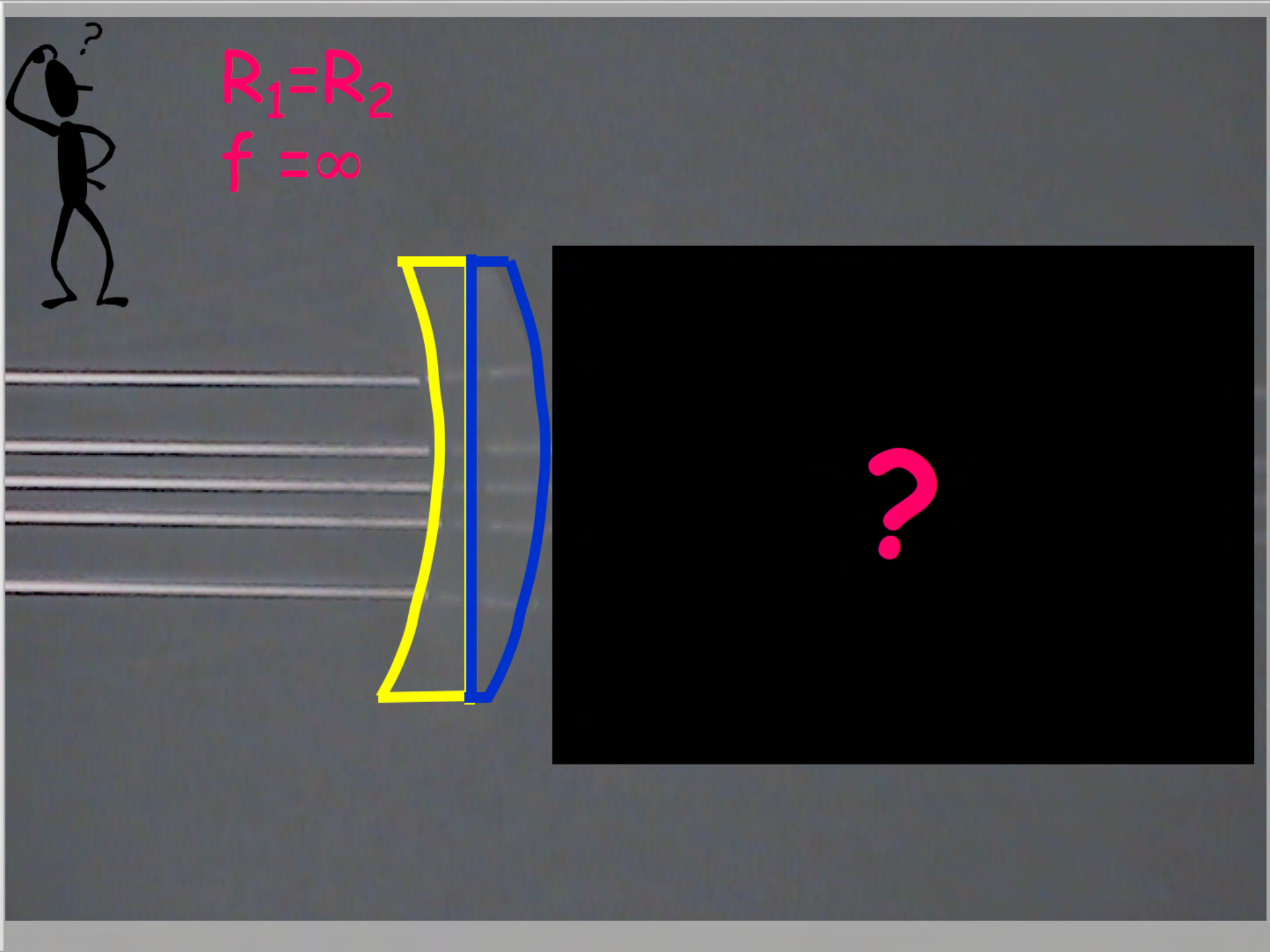


?

$R_1 = \infty$

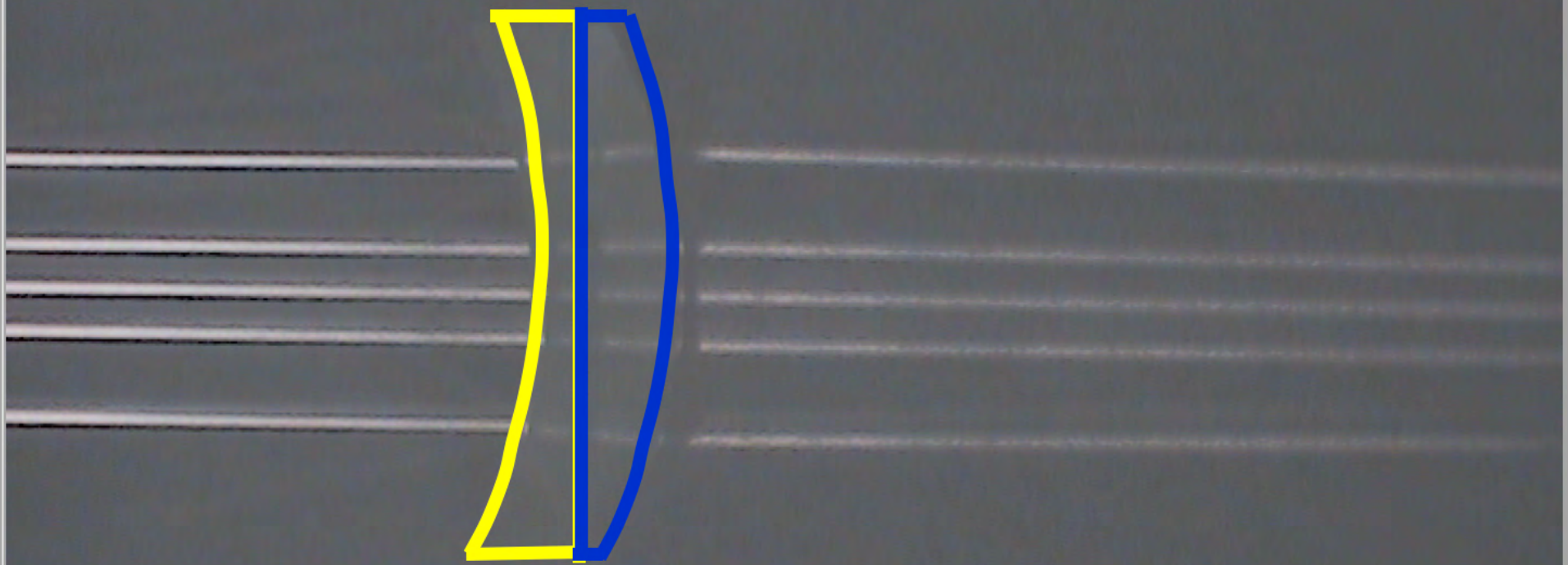
$R_2 = \infty$

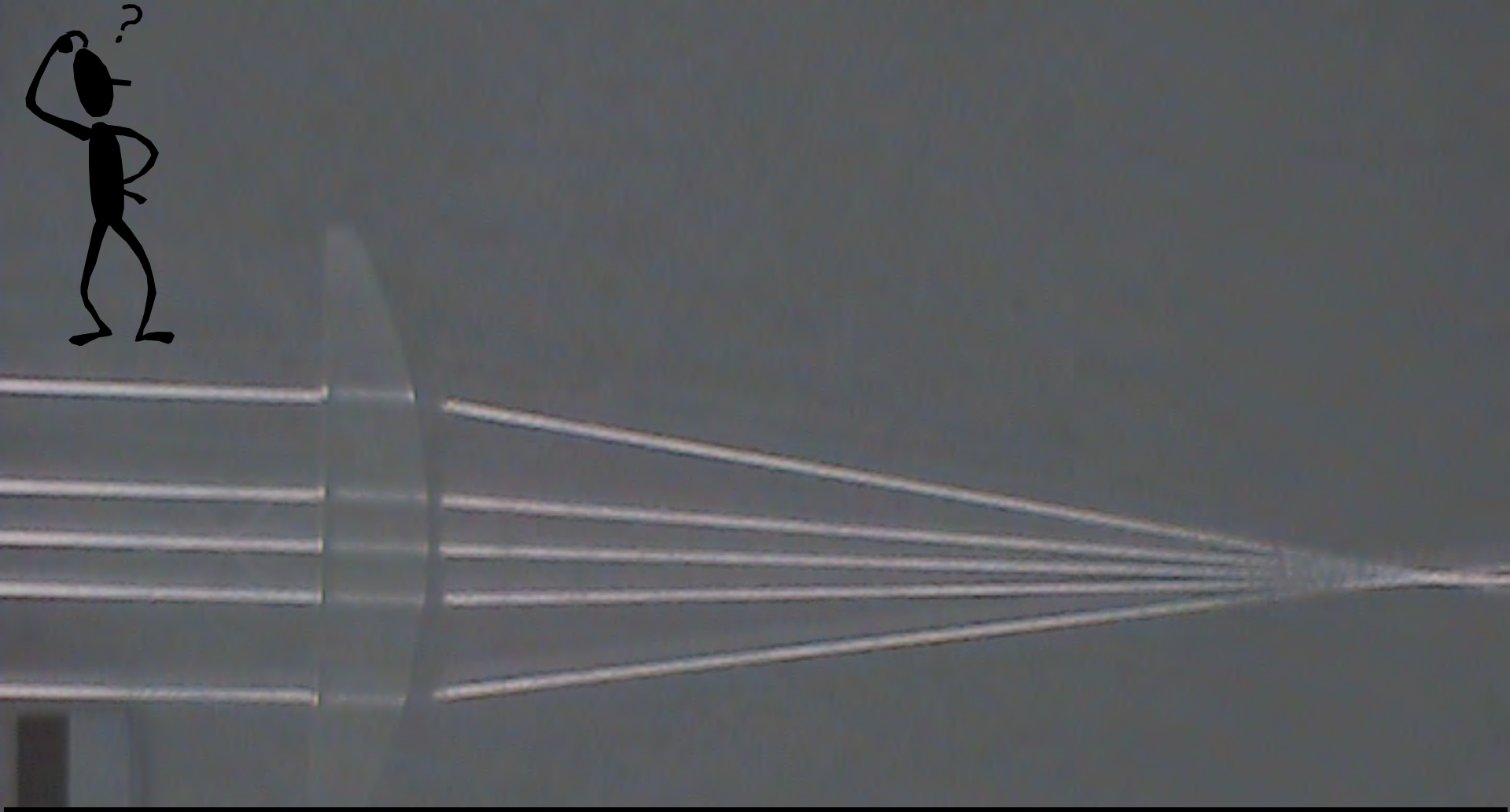
$f = \infty$


$R_1 = -R_2$
$f = \infty$
?

$R_1 = -R_2$

$f = \infty$





Cosa succede all'immagine reale se si copre parte di una lente (o di uno specchio)?