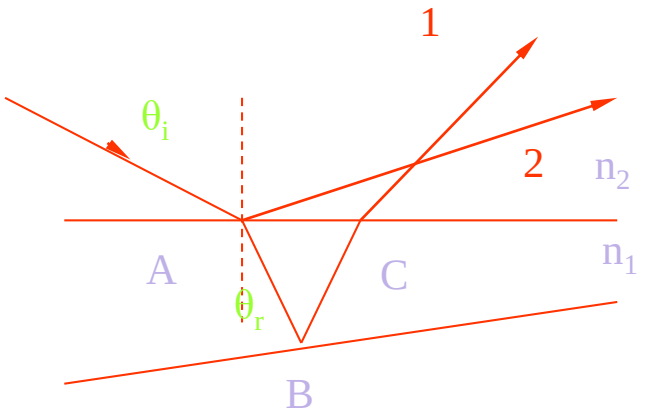
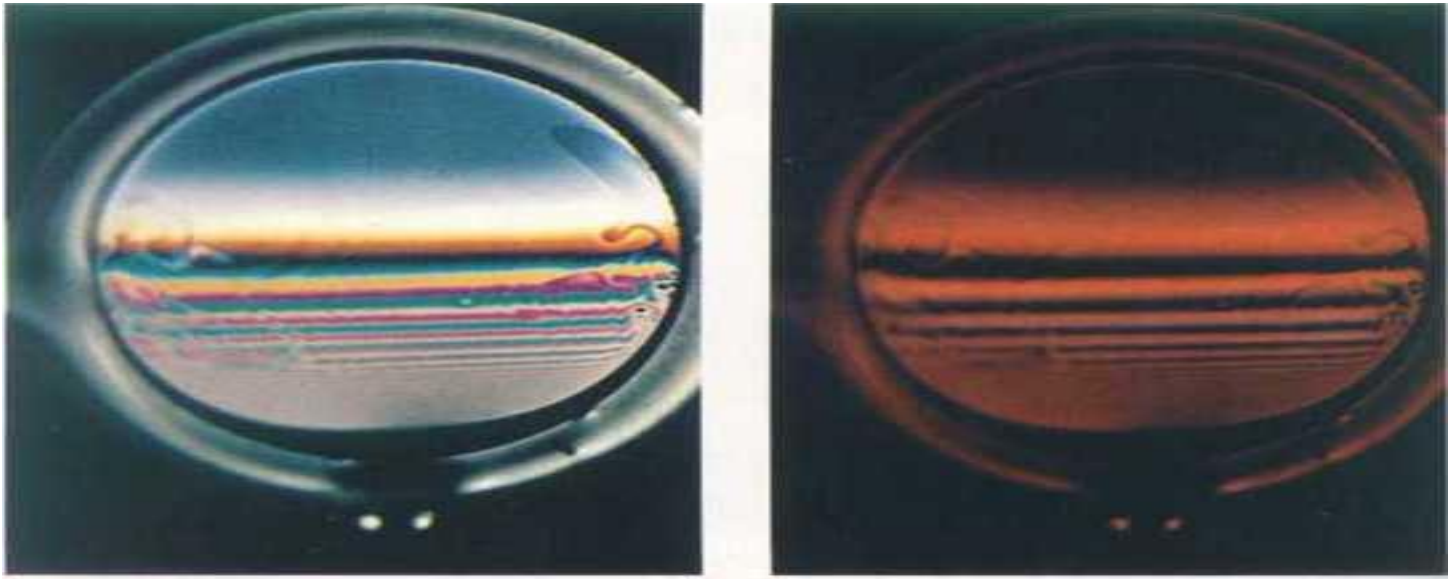
- **2. 等厚干涉**
  - 等厚干涉是定域干涉





B. Interference produced by reflecting white light from a soap film. The picture on the right shows the pattern produced by red light.

- i° 定量讨论单色扩展光源

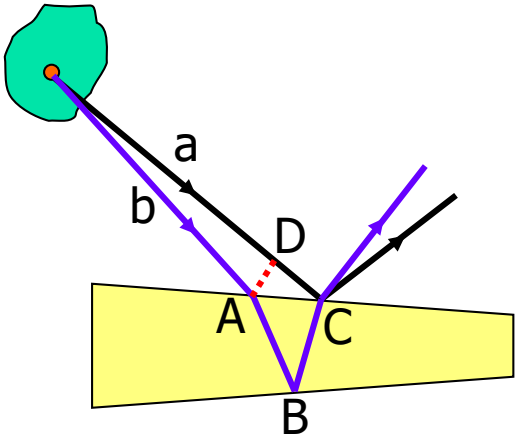
$\Delta L=n(AB+BC)-DC+\lambda/2$

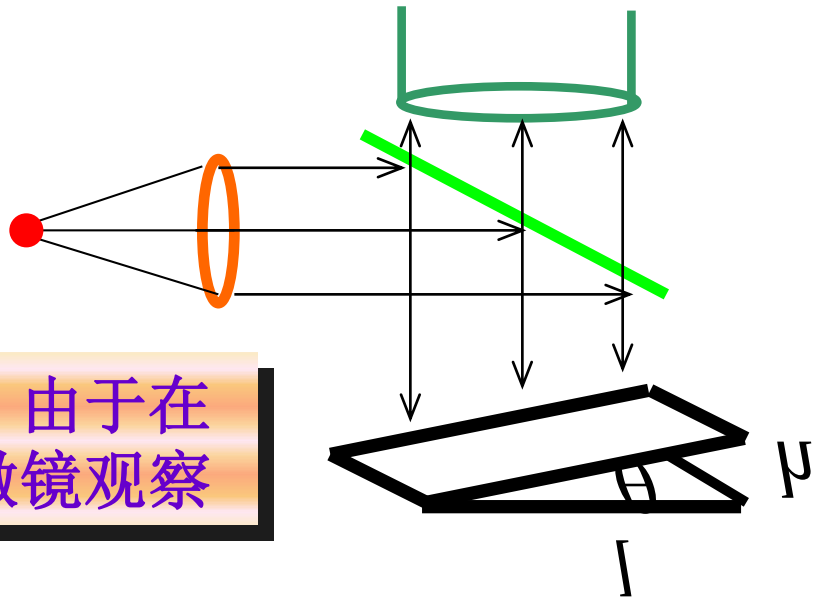
一般夹角很小，有$AB\approx BC$

$\therefore \Delta L=2ne\cos\theta_2+\lambda/2$

对于一般的垂直入射光，

$\Delta L=2ne+\lambda/2$





等厚干涉的观察与等倾干涉类似，由于在膜面产生干涉，可直接用眼或显微镜观察

- ΔL只与厚度e有关，对于e一定的地方，ΔL一定，干涉强弱亦一定。所以，契性膜的干涉条纹是直条纹。

条纹间距

由光程差公式

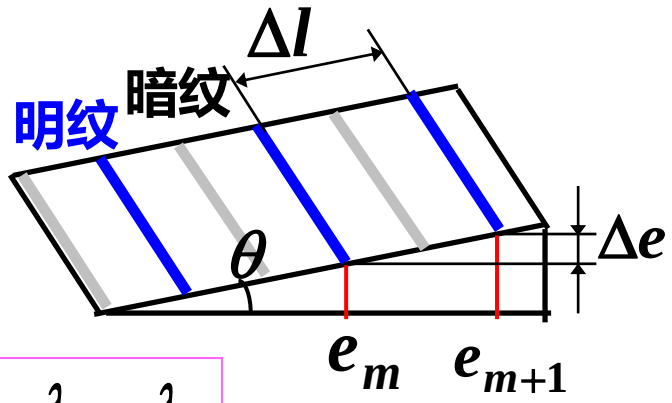
$$2ne_m+\frac{\lambda}{2}=m\lambda$$

$$2ne_{m+1}+\frac{\lambda}{2}=(m+1)\lambda$$

$$2n\Delta e=\lambda$$

$$\Delta e=\frac{\lambda}{2n}=\frac{\lambda_n}{2}$$

相邻条纹的厚度差

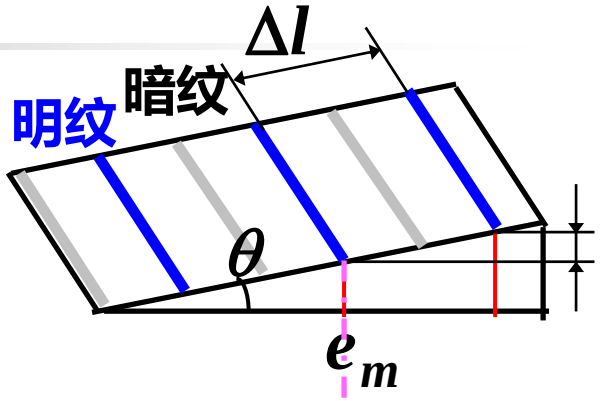


$$\Delta l\approx\frac{\Delta e}{\theta}$$

条纹间距 $$\Delta l\approx\frac{\lambda}{2n\theta}$$

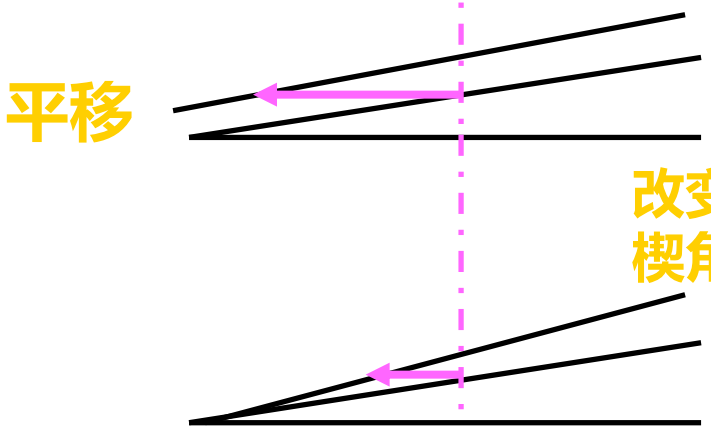
条纹的移动 **反映膜的厚度变化**

$$2ne_m+\frac{\lambda}{2}=m\lambda\ (m=1,2,3,\cdots)$$

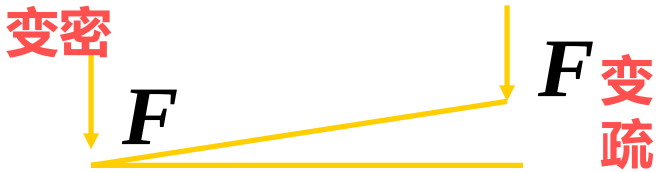


条纹疏密的变化

反映楔角的改变



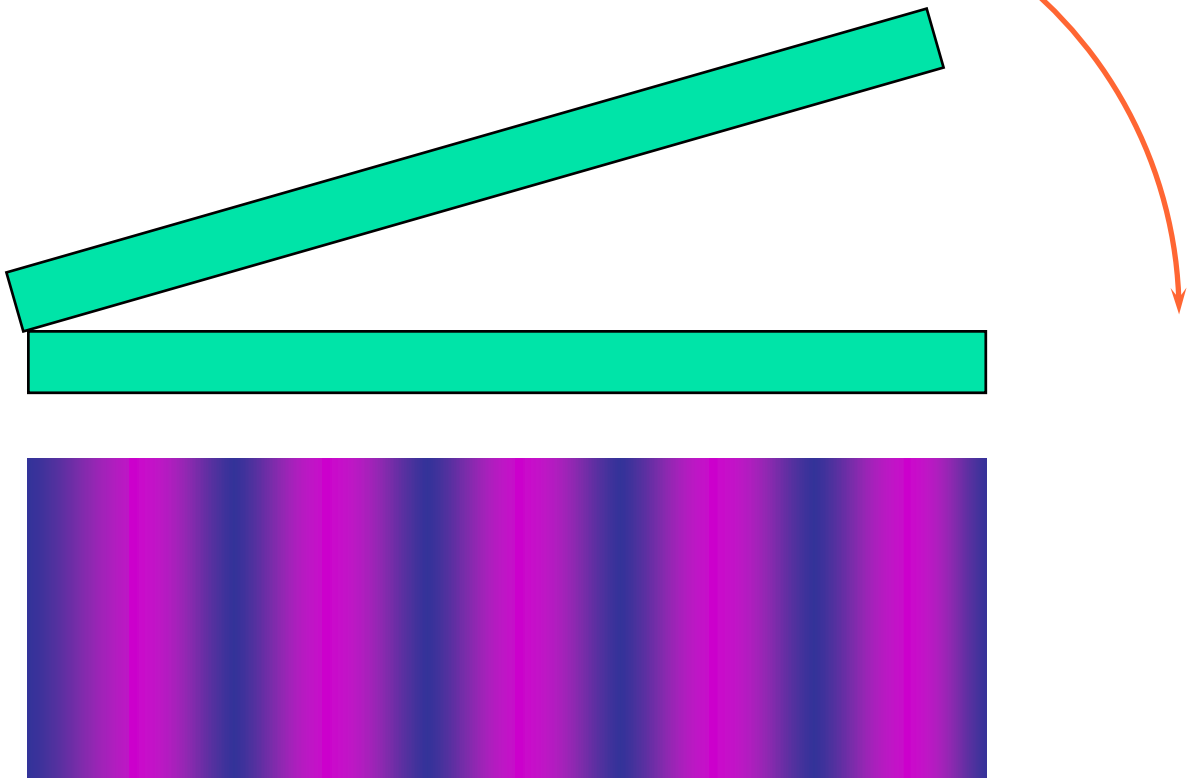
条纹间距 $\Delta l\approx\frac{\lambda}{2n\theta}$



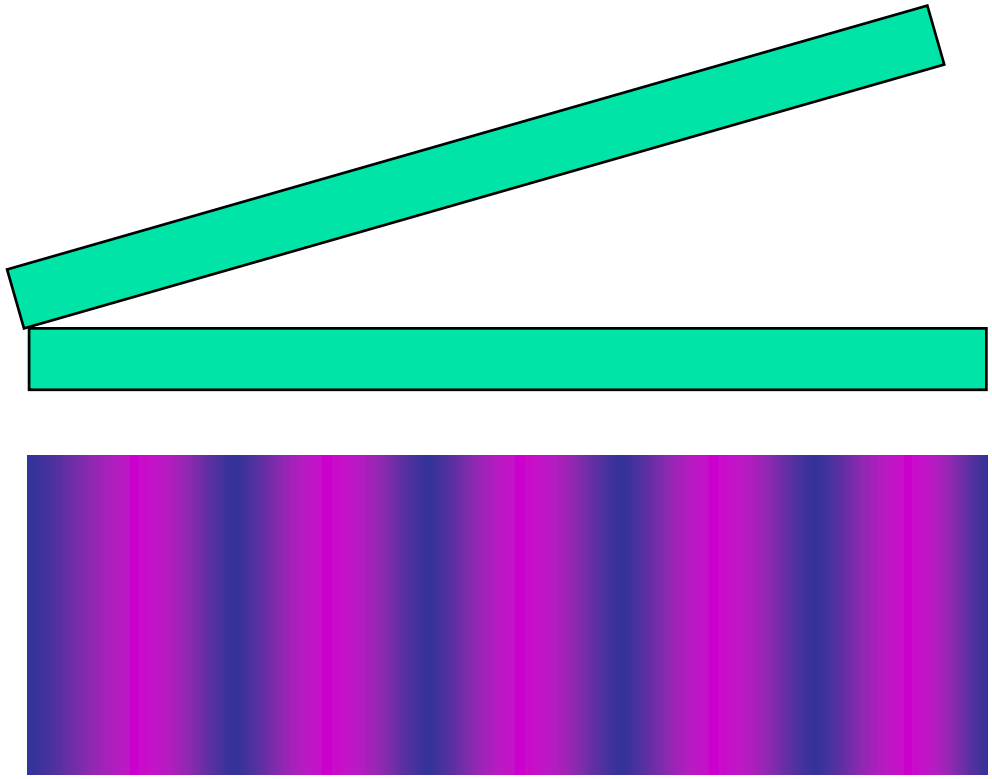
盯住某一级，

看这一级对应的厚度在哪

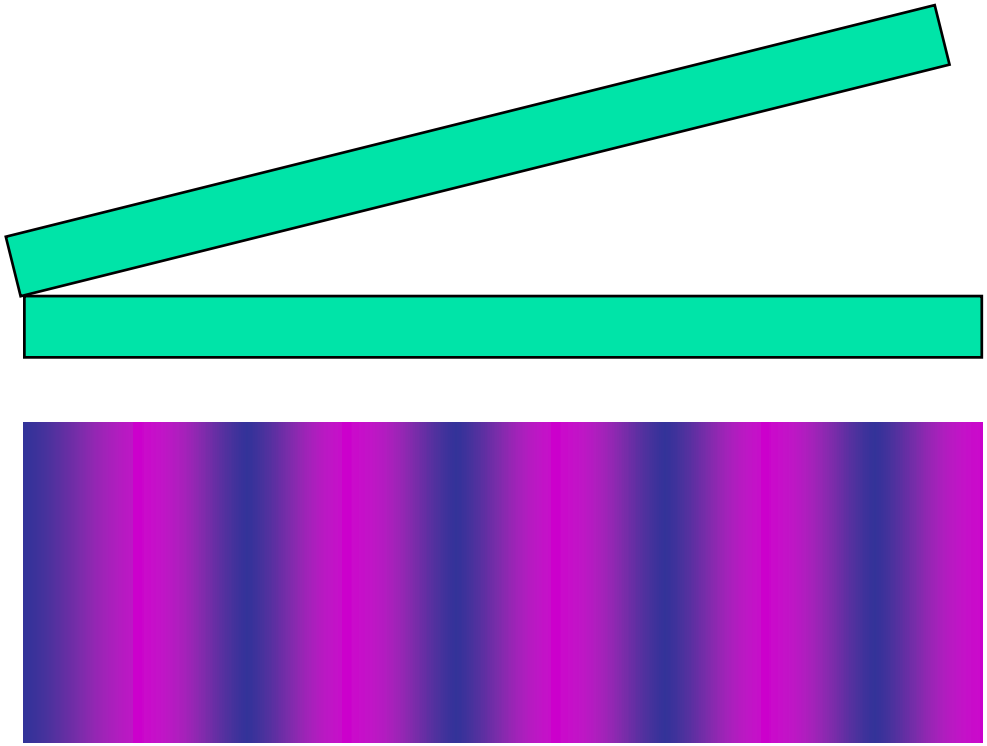
夹角变小，条纹变宽，条纹向右移动



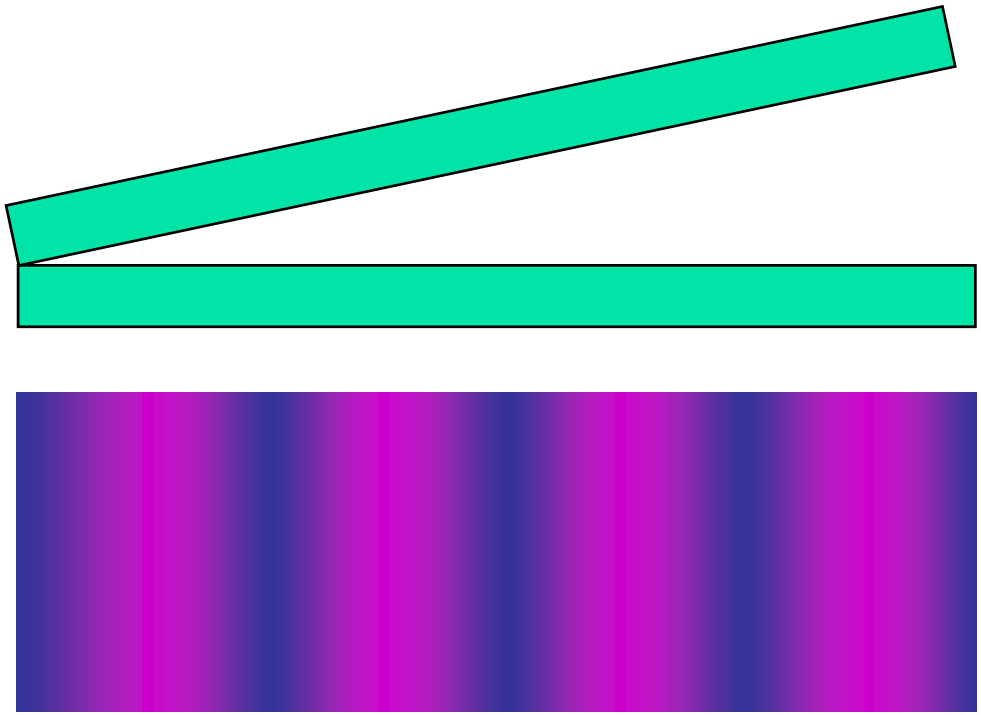
夹角变小，条纹变宽，条纹向右移动



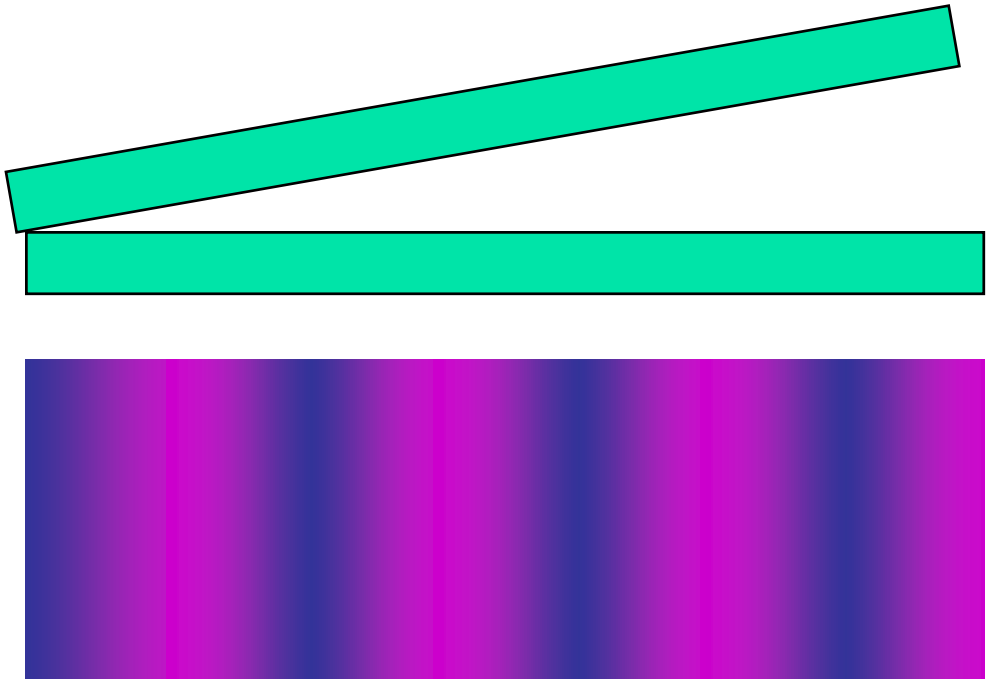
夹角变小，条纹变宽，条纹向右移动



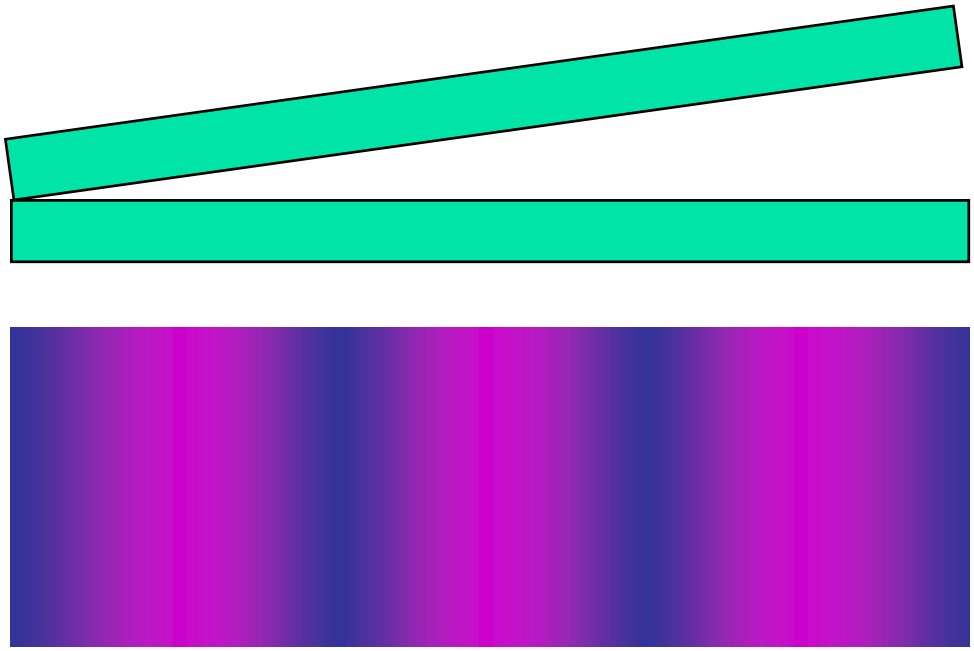
夹角变小，条纹变宽，条纹向右移动



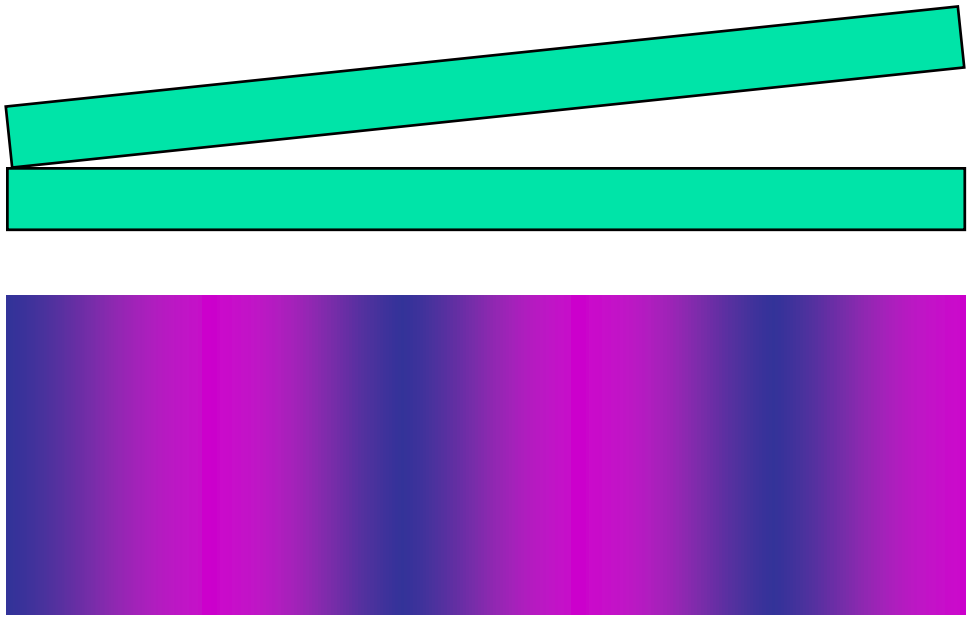
夹角变小，条纹变宽，条纹向右移动



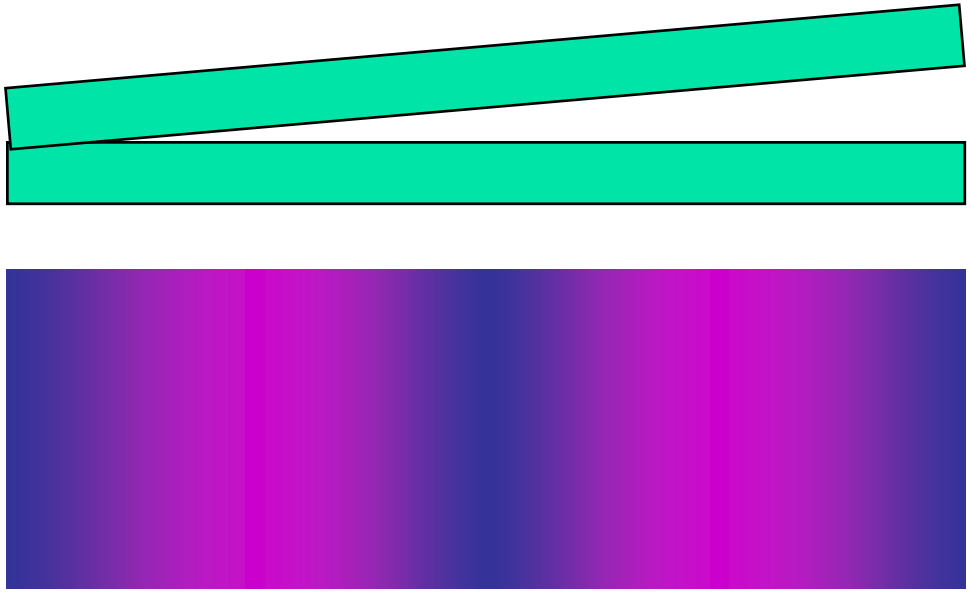
夹角变小，条纹变宽，条纹向右移动



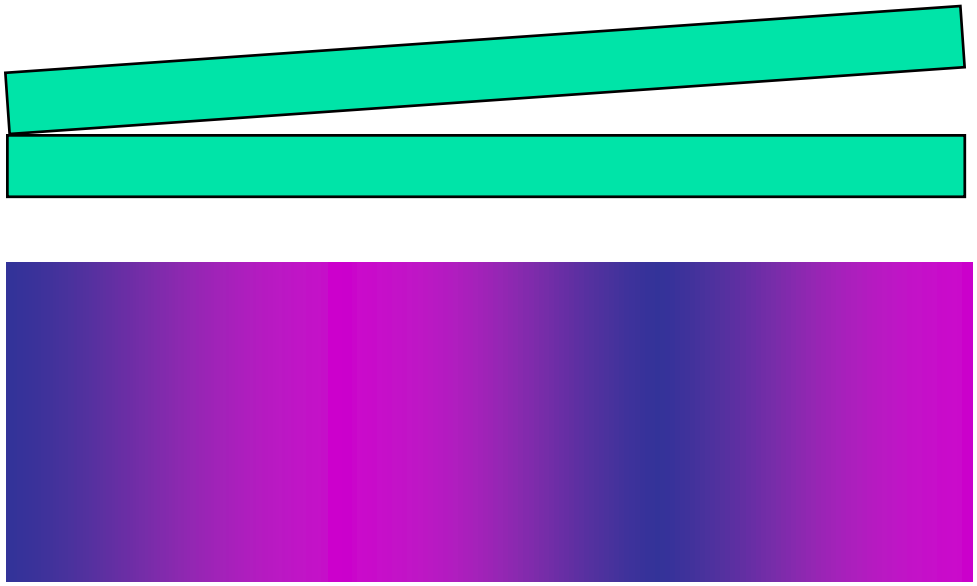
夹角变小，条纹变宽，条纹向右移动



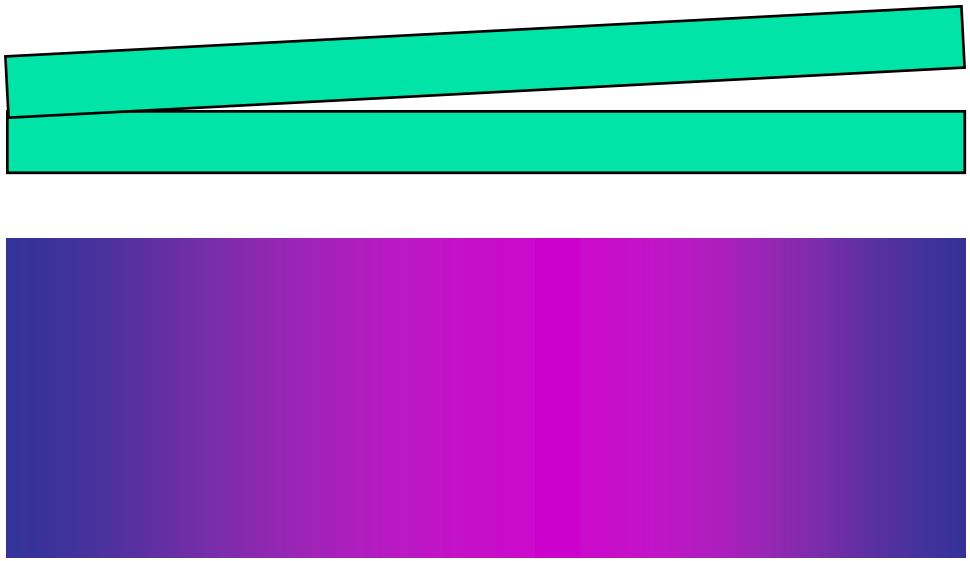
夹角变小，条纹变宽，条纹向右移动



夹角变小，条纹变宽，条纹向右移动



夹角变小，条纹变宽，条纹向右移动



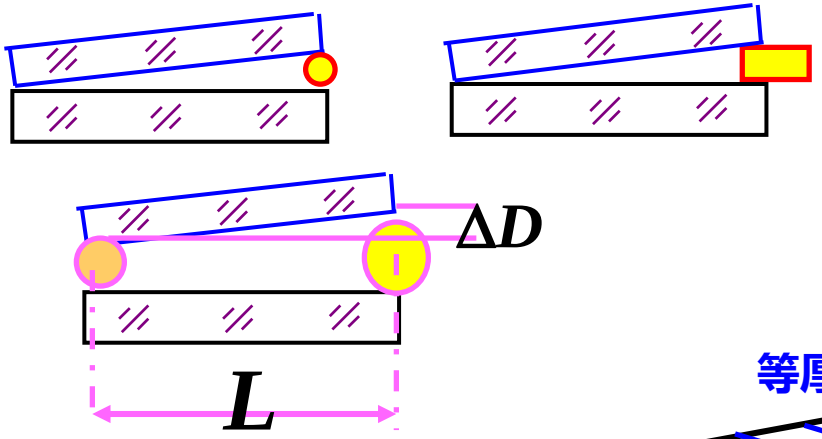
夹角变小，条纹变宽，条纹向右移动

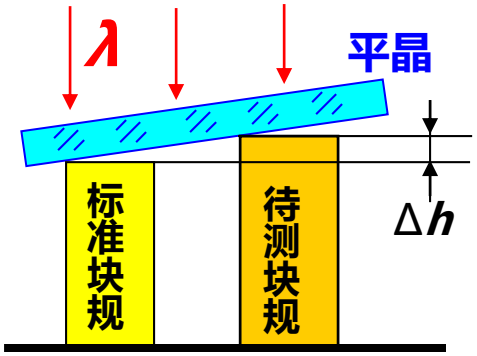
夹角变小，条纹变宽，条纹向右移动

- ii° 等厚干涉的应用

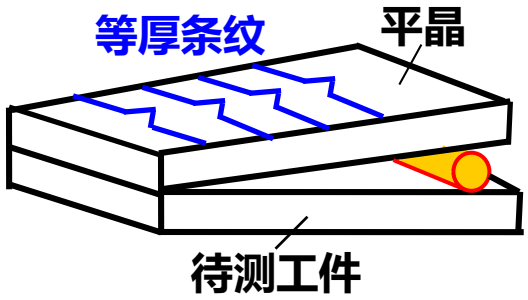
$$\Delta l \approx \frac{\lambda}{2n\theta}$$

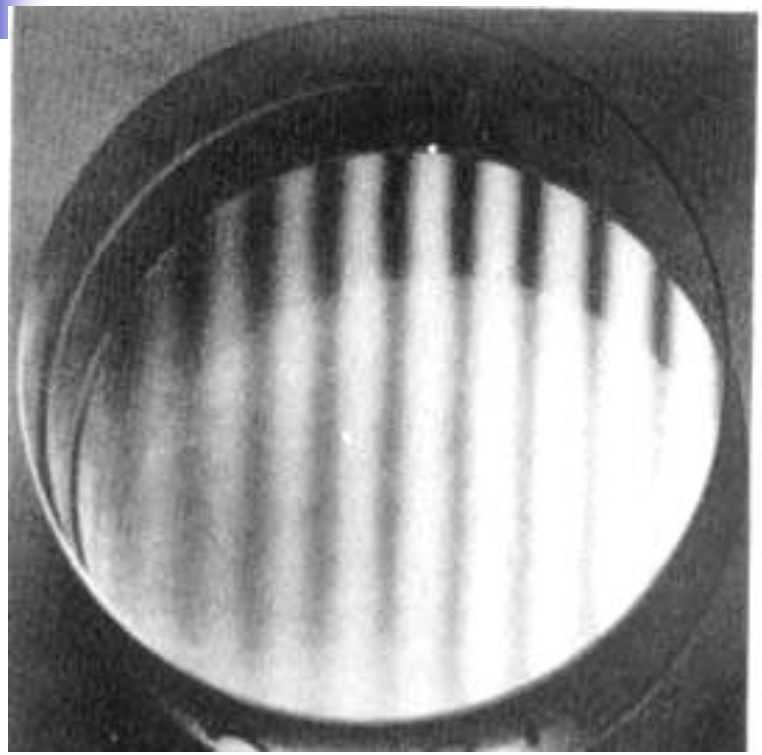
- 测波长
- 测折射率
- 测细小直径、厚度、微小变化





- 测表面不平度





劈尖

不规则表面

等厚干涉条纹

利用劈尖的等厚干涉可以测量很小的角度。今在玻璃劈尖上，垂直入射波长为 5893Å 的钠光，测得相邻暗条纹间距为 $5.0mm$，若玻璃的折射率为 1.52，求此劈尖的夹角。

解：

$$\theta \approx \sin\theta = \frac{\lambda}{2\mathrm{nl}} = \frac{5.893\times10^{-4}}{2\times1.52\times5.0} = 3.88\times10^{-5}\,rad$$

$$= 8''$$