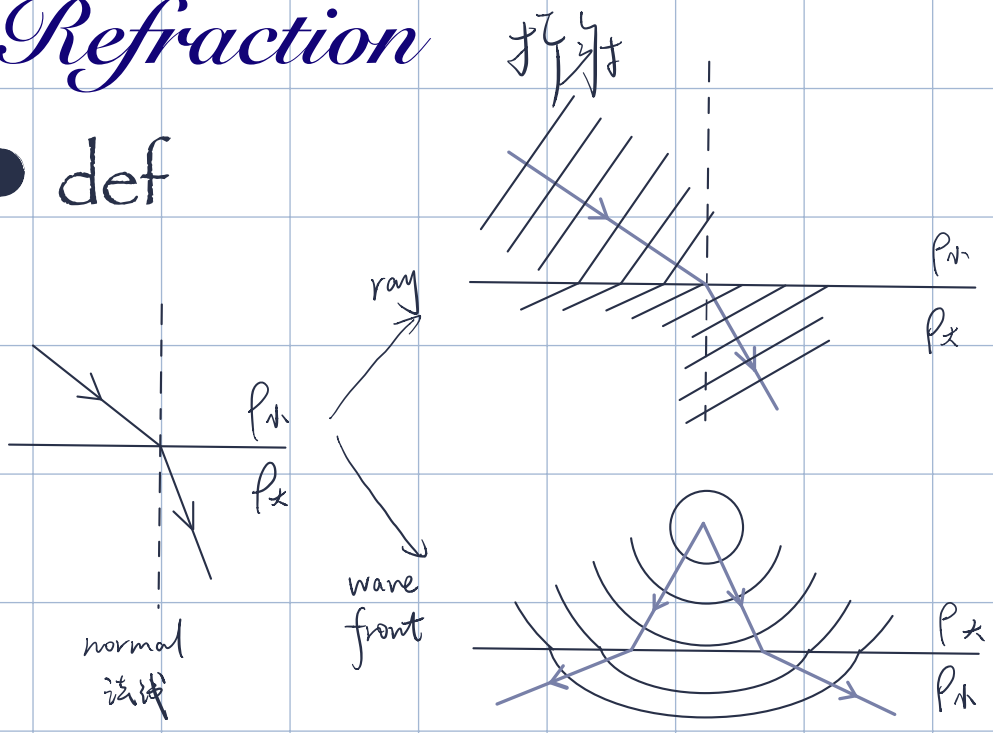
Refraction 折射

- def

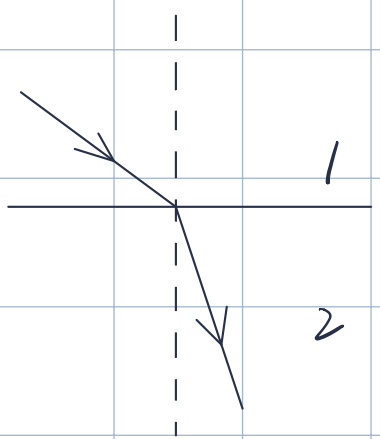


1. What { median → median
   direction of wave travel change

2. Why $\rho \rightarrow v \uparrow \xrightarrow[\lambda = \frac{v}{f}]{f\text{不变}} \lambda \downarrow \rightarrow \theta$(折射角)

{ 机械波(地震波,声波) $\rho\uparrow \rightarrow v\uparrow$
  电磁波(光波) $\rho\uparrow \rightarrow v\downarrow$

3. 定量 n (refractive index 折射率) $\rightarrow \theta$



Snell's law : $n_1 \sin\theta_1 = n_2 \sin\theta_2$

绝对折射率 : $n = \frac{c}{v}$ ← 波在真空中速度
(≥ 1) ← 波在该介质中速度

$$\frac{v_1}{v_2} = \frac{n_2}{n_1} = \frac{\sin\theta_1}{\sin\theta}$$ (真空中 $n=1$)

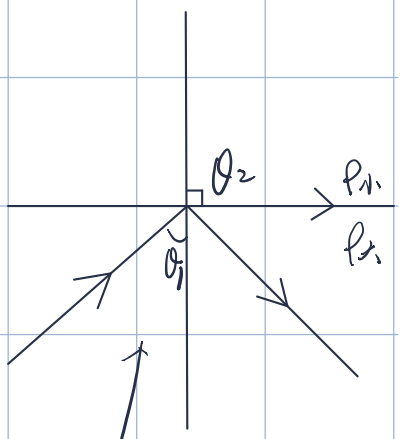
total internal reflection 全反射

发生全反射的条件

- 介质：高密度 → 低密度

  $v_{光}$ 大 → 小

  n 大 → 小



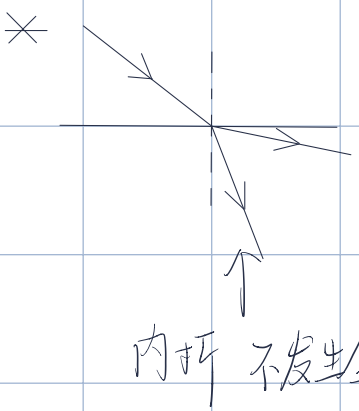
入射角超过 θ_1 为 total inscretical angle

- 角度：入射角超过 critical angle

  全反射时 $\theta_2 = 90°$

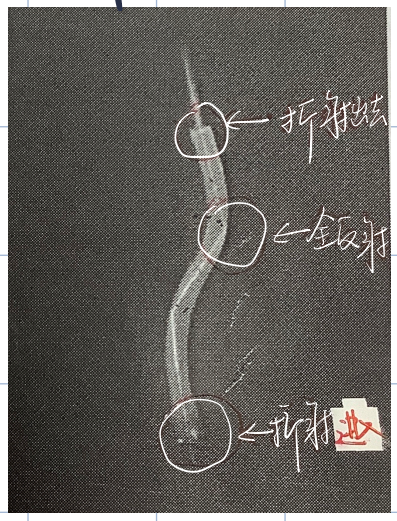
  $C = \sin^{-1}\left(\frac{n_2}{n_1}\right)$ → 为入

  ↑ 临界角 cretical angle



内折 不发生全反射

eg: 描述光路

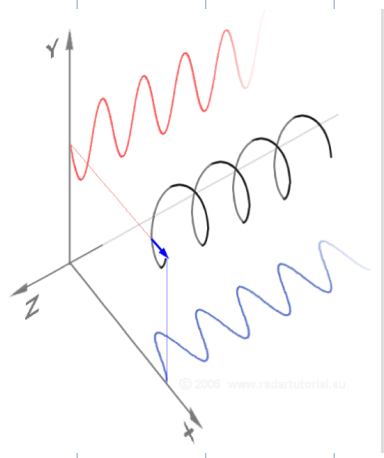


① total internal reflection take place
because instant angle > critical angle

② it take place many times

③ light refract out
incident angle < critical angle

Polarization 偏正

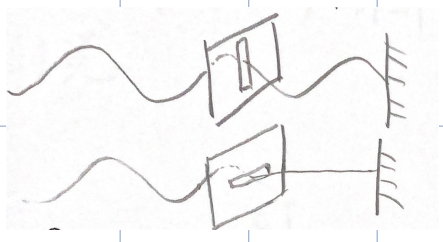


- def

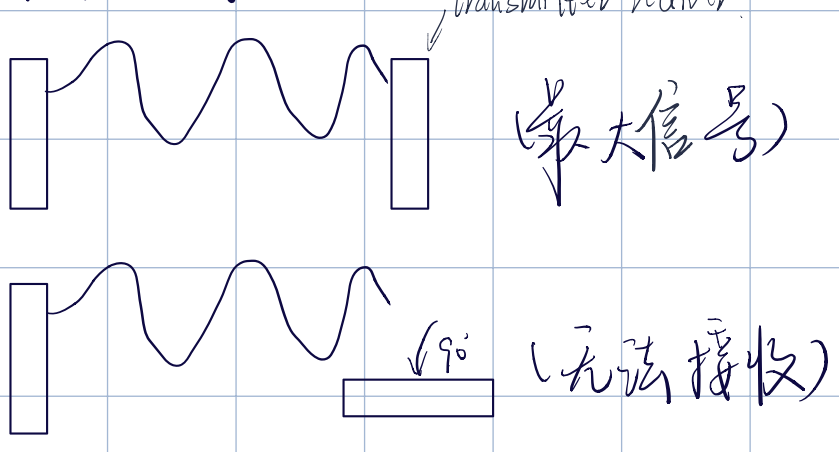
条件：transverse wave

- Polarized wave: wave oscillates in only one direction which is perpendicular to the direction of travel.
- Plane polarized: oscillates in only one plane which include direction of oscillation and travel.
- Polarized EM wave: strength of electric field.
- Unpolarized wave: oscillate in all direction. ep. 可见光

- EM wave

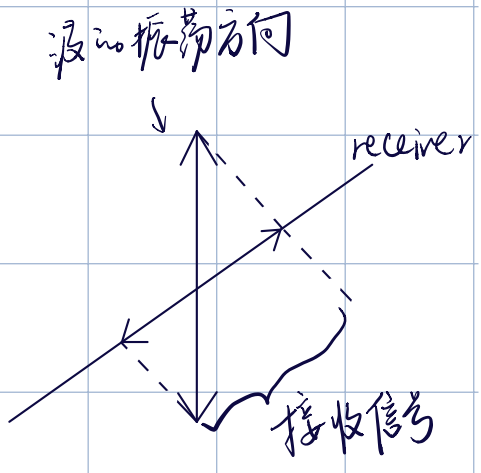


① microwave



(最大信号)

(无法接收)



② light

laser：光子所有特质(i.e. 传播方向、振动方向)完全一致

↓

偏正

● Polarized light 偏正光

在所有光滑表面发出耀眼的光是偏正光

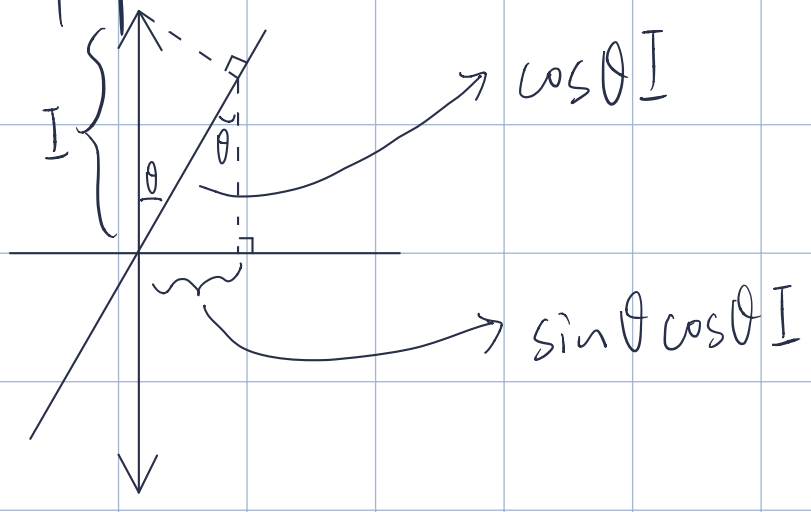
偏正光//眼睛（水平偏正）

- 产生方式

① filter 偏正片（非偏正光穿过偏正片可形成偏正光）

② 大多数反射光

- 计算



$\begin{cases} P_1 // P_2 & \text{光强最大} \\ P_1 \perp P_2 & \text{光强为0} \end{cases}$