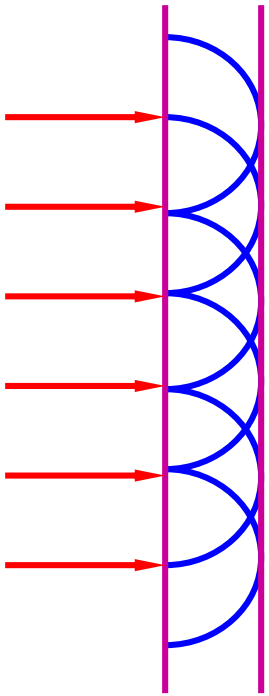
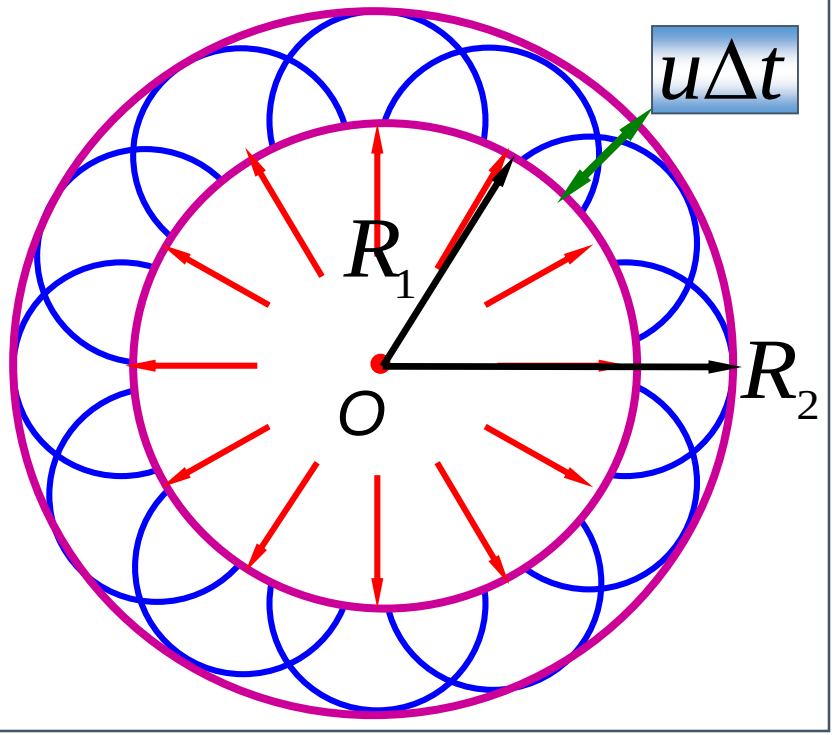
一　惠更斯原理

介质中波动传播到的各点都可以看作是发射子波的波源，而在其后的任意时刻，这些子波的包络就是新的波前.

平面波



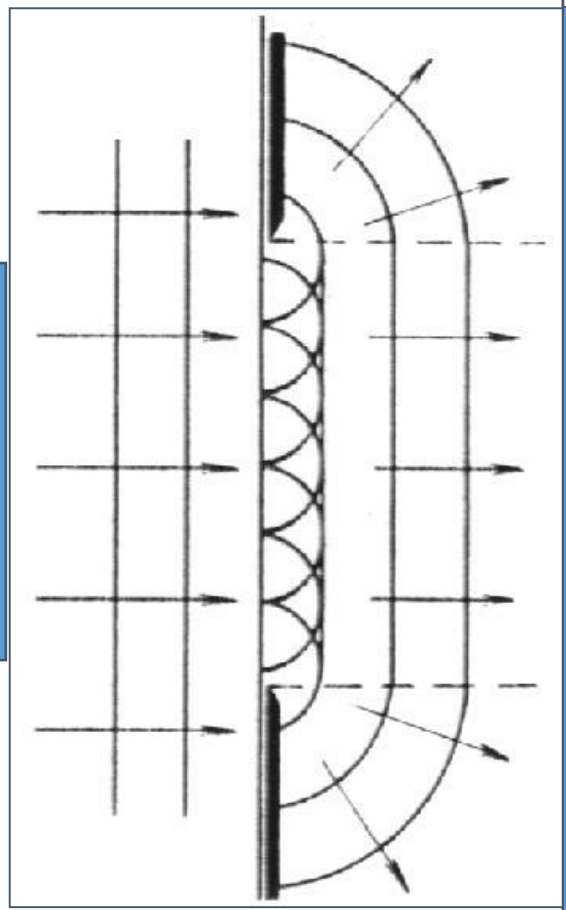
球面波



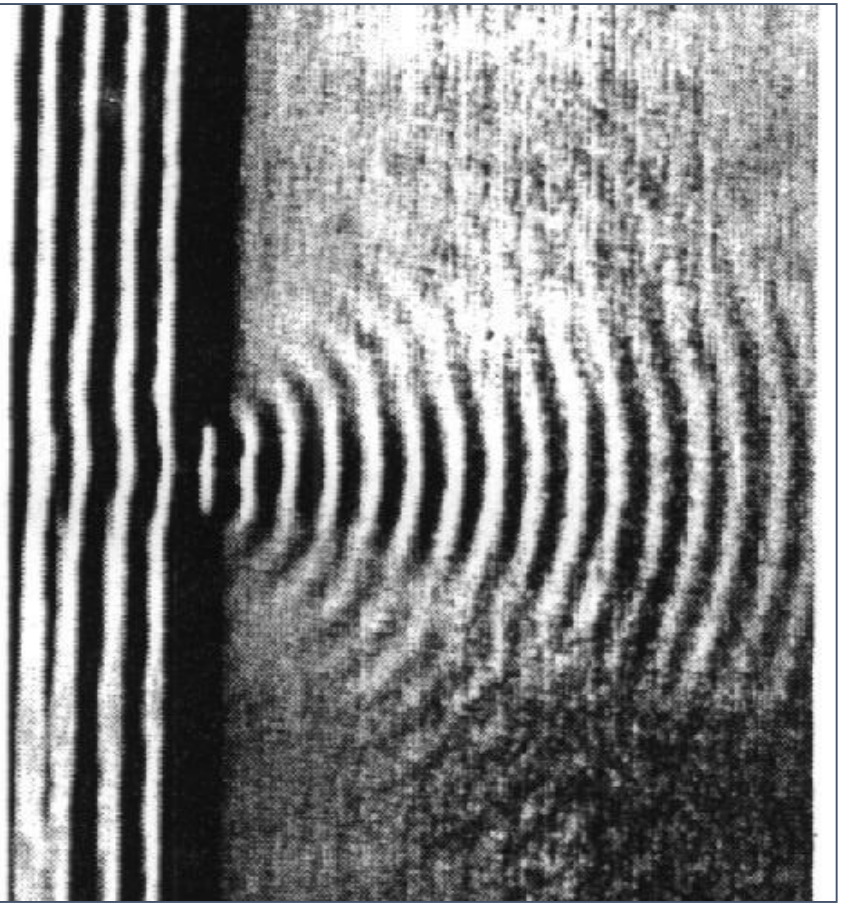
二　波的衍射

波在传播过程中遇到障碍物时，能绕过障碍物的边缘，在障碍物的阴影区内继续传播.

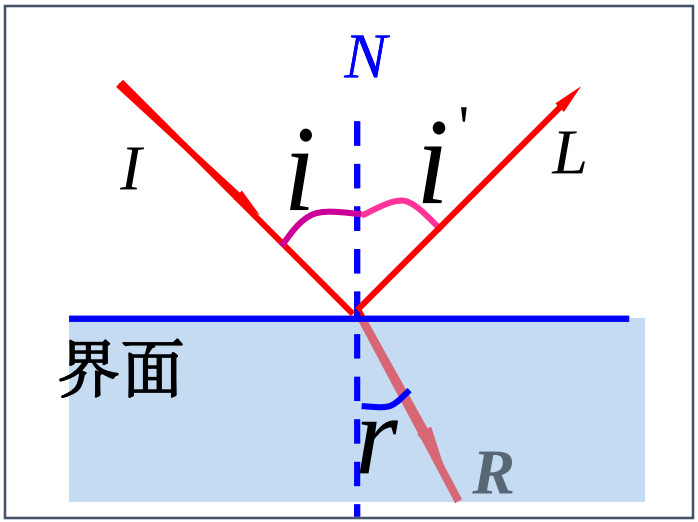
波的衍射



水波通过狭缝后的衍射



三　波的反射和折射

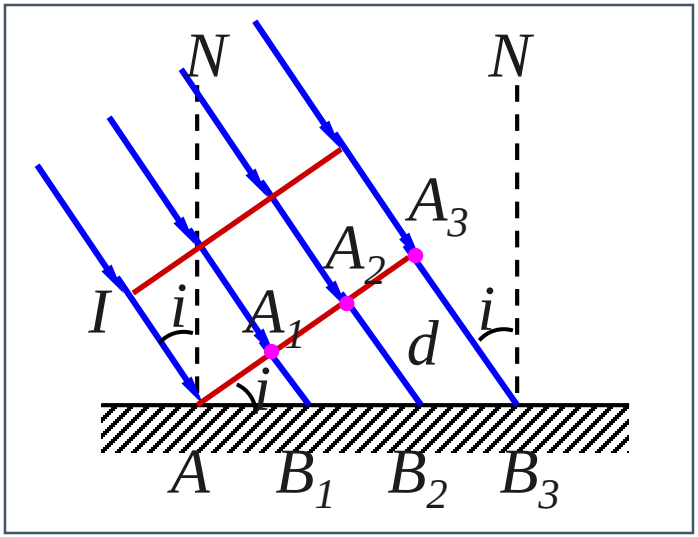


反射定律

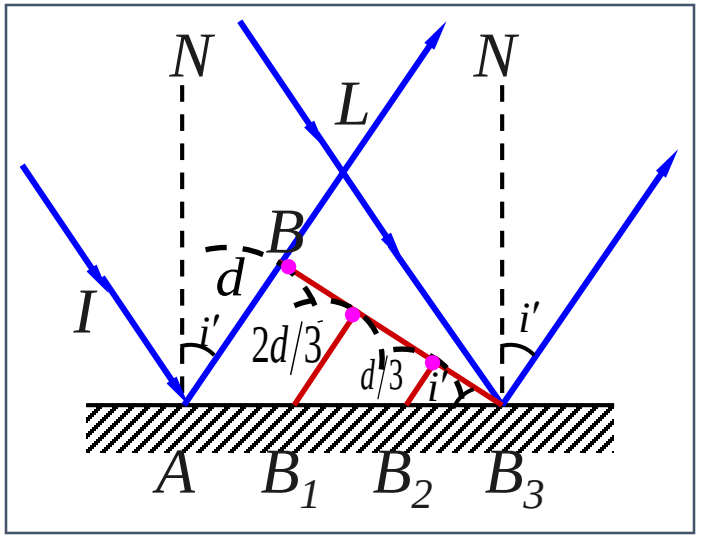
1）反射线、入射线和界面的法线在同一平面内；

2）$i = i'$

用惠更斯原理证明.

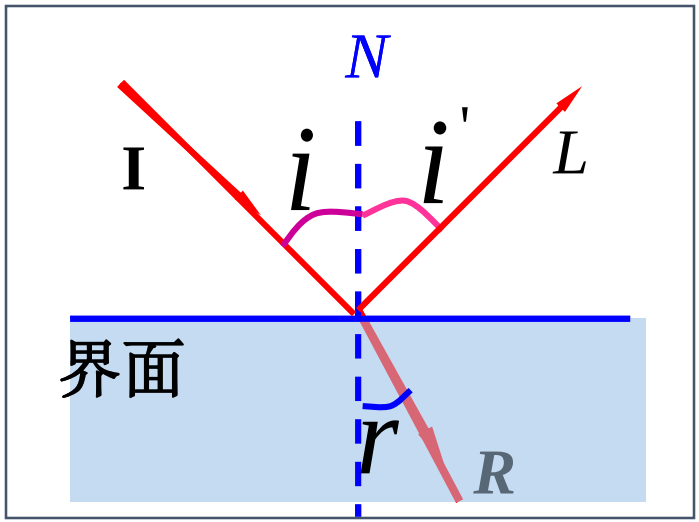


时刻 t



时刻 $t+\triangle t$

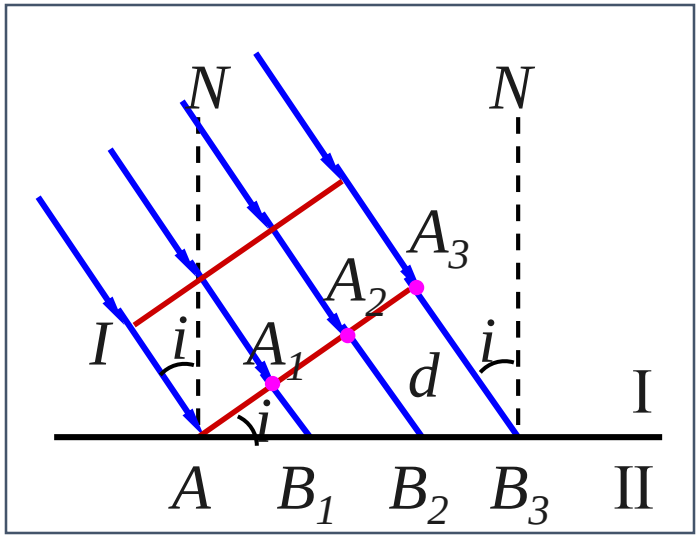
波的折射



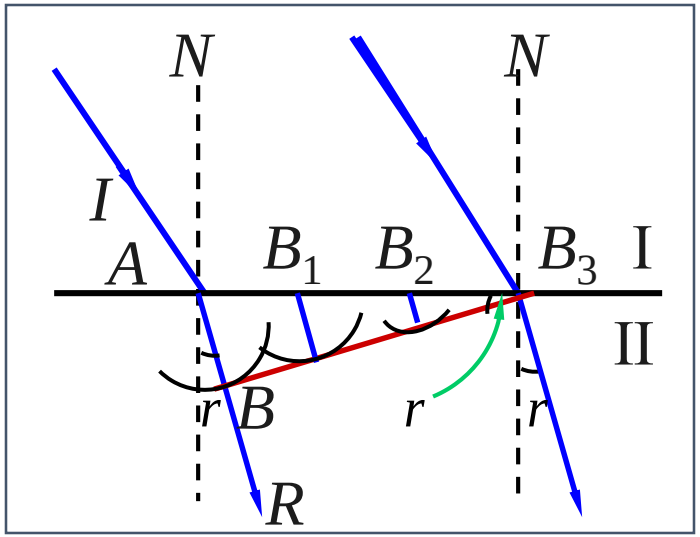
1）折射线、入射线和界面的法线在同一平面内；

2）$\dfrac{\sin i}{\sin r}=\dfrac{u_1}{u_2}$

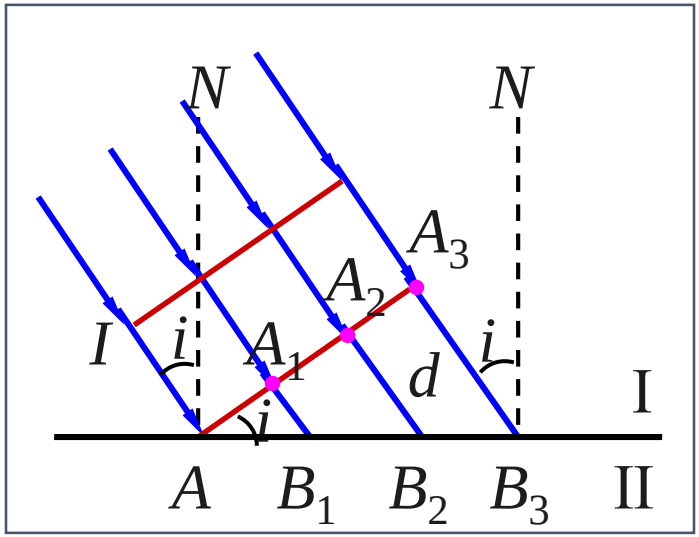
用惠更斯原理证明.



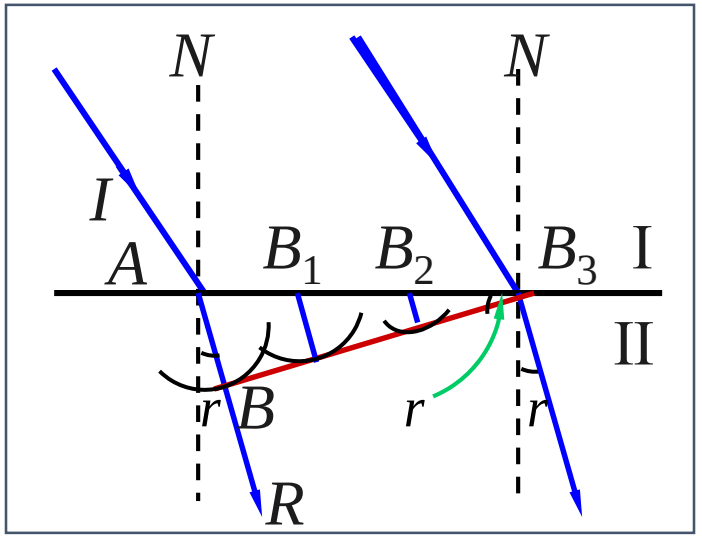
时刻 t



时刻 $t+\triangle t$



时刻 t



时刻 $t+\triangle t$

$$A_3B_3 = u_1\Delta t \qquad AB = u_2\Delta t$$

$$\angle A_3AB_3 = i \qquad \angle BB_3A = r$$

所以 $$\frac{\sin i}{\sin r} = \frac{A_3B_3}{AB} = \frac{u_1}{u_2}$$