

Constructive
waves in phase (in sync)
Additive

+ Crest + trough $\begin{matrix} + & + & \text{or} & - & - \\ A=3 & + & \text{or} & - & - \end{matrix}$

$A=3 \Rightarrow \text{wave}$ $A=4 \Rightarrow \text{wave}$ = $A=3+4$ resulting wave

\uparrow Amplitude

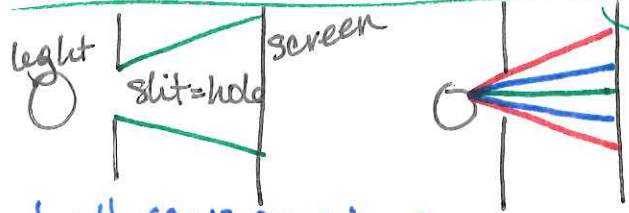
Destructive
waves out phase (out of sync)
Subtractive

+ - or - + $A=3-4=-1$ down

$A=3 \Rightarrow \text{wave}$ $A=4 \Rightarrow \text{wave}$ = wave

\downarrow Amplitude

Diffraction Grating = Barrier to light
creates a pattern on screen



light slit=hole screen

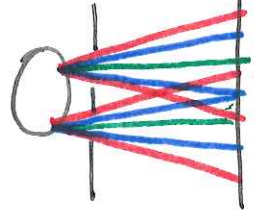
not all rays are in sync
 γ : outside rays longer further travel; $v=c$

— dimmest
— dimmer
— bright
— dimmer
— dimmest

Double Slit Experiment by Young

where rays "interact" \Rightarrow interference

if rays in sync = Const \Rightarrow bright
if rays out sync = Destr \Rightarrow darker
+ - Amp will cancel



slightly out of phase Const
nothing Destr
brightest = Const
nothing

How change pattern

smaller = smaller slits
slits closer together
use shorter λ γ : crest + trough closer more possibility to interf.

wider = opposite