

# Photoelectric Effect (1)

Not phase difference!

Electrons in a metal are bound by an energy  $\Phi$ , called the **work function**.

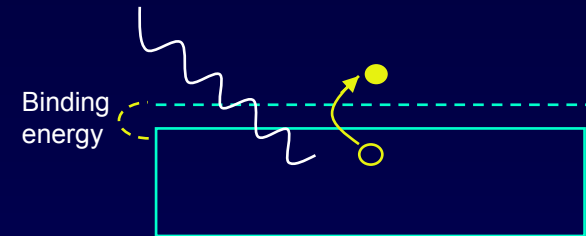
If you shine light on a clean metal surface, electrons can emerge  $\rightarrow$  the light gives the electrons enough energy ( $> \Phi$ ) to escape.

Measure the flow of electrons with an ammeter.

How will the current depend on intensity and frequency?

We might expect:

- Increasing the intensity should increase the current. Or maybe the energy of the electrons.
- Increasing the frequency shouldn't matter much. Perhaps a decrease in current due to rapid oscillations.
- With low intensity, there should be a time delay before current starts to flow, to build up enough energy.



Workfunction  $\Phi$ :

- minimum energy needed to liberate an electron from the metal.
- defined to be positive.
- usually given in eV units

This follows from the idea that light is a continuous wave that consists of an oscillating E and B field. The intensity is proportional to  $E^2$ .