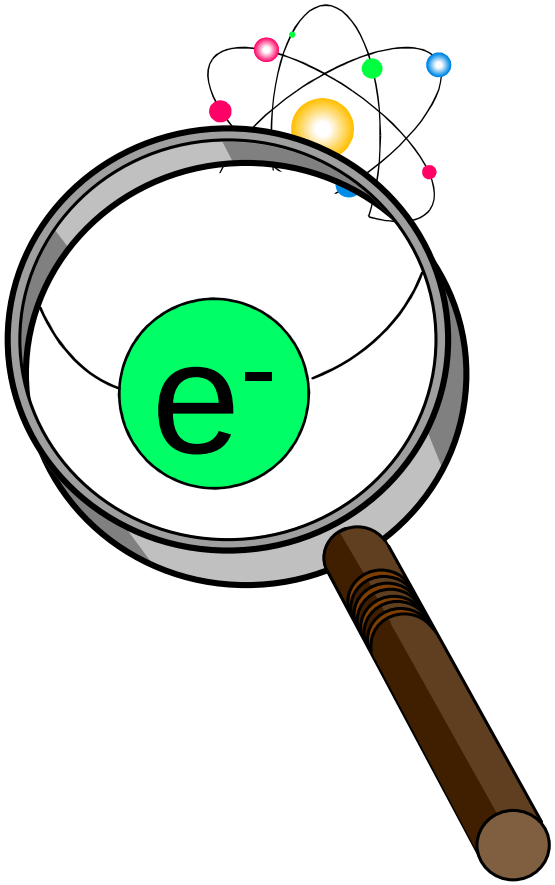
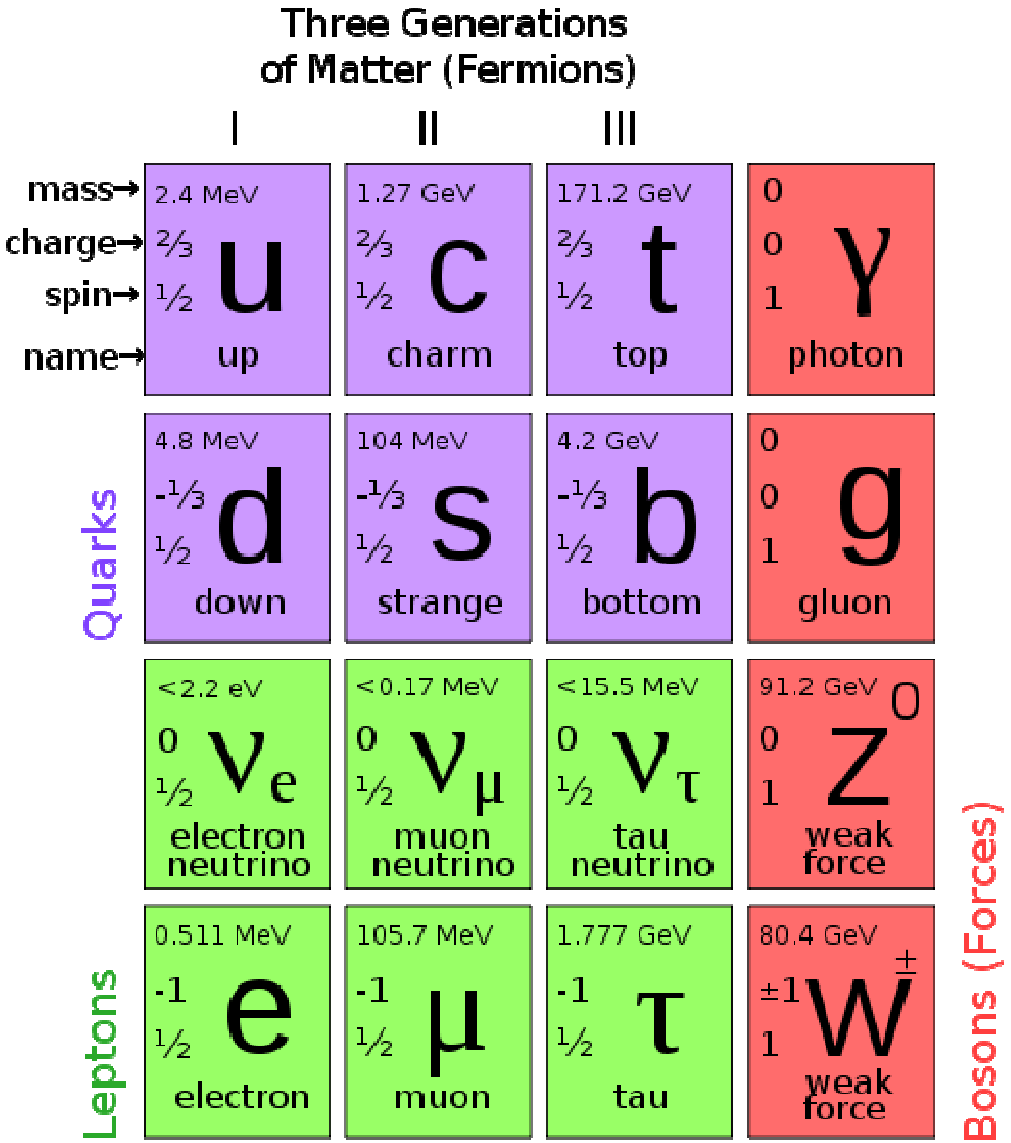


electron:

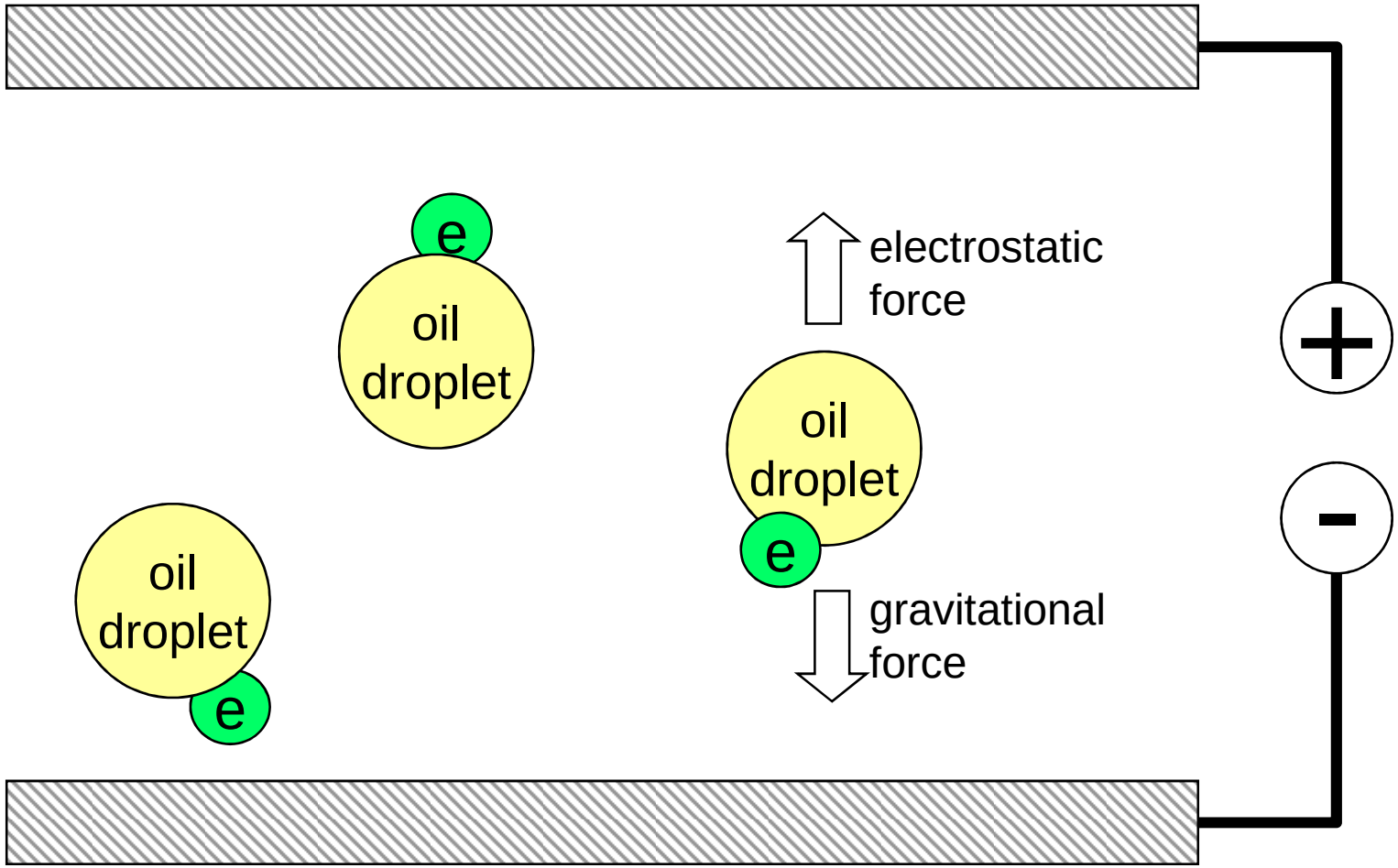
charge:	$1{,}602 \cdot 10^{-19}$ C
spin:	1/2
mass:	$9{,}108 \cdot 10^{-28}$ g
radius:	$2{,}8 \cdot 10^{-15}$ cm



From: Dave Fehling, The Standard Model of Particle Physics: A Lunchbox's Guide

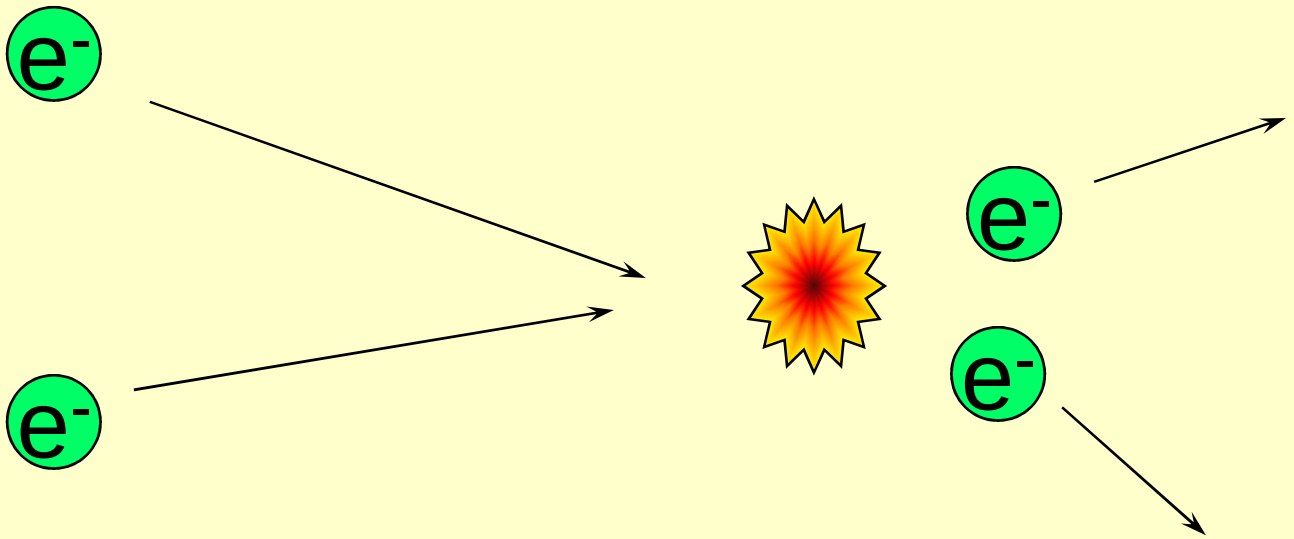
Millikan‘s experiment (1911, Nobel Price in 1923):

Oil droplets are sprayed in a chamber between two electrodes and charged by ionizing radiation. Their motion is observed by a microscope.

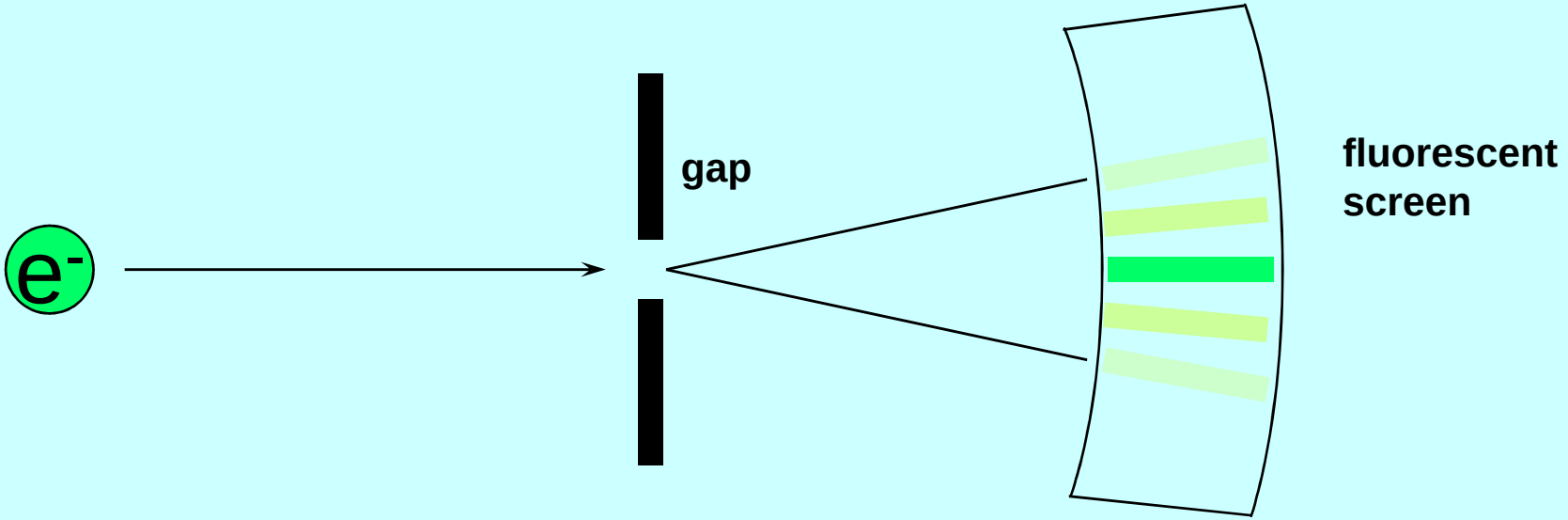


The sinking motion of the droplets caused by the gravitational field can be balanced by the correct adjustment of the voltage in the cell.

electrons behave like particles:

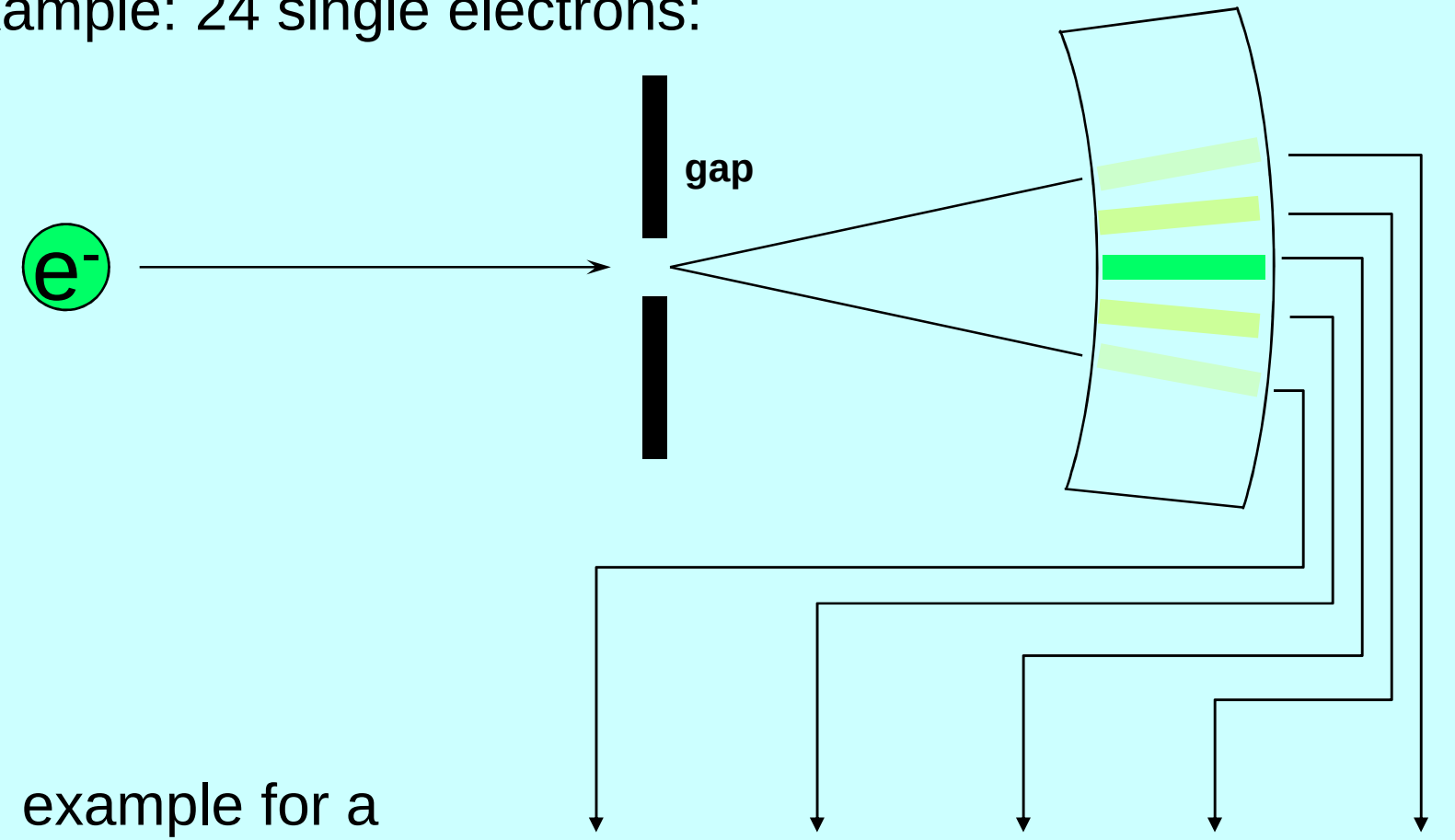


electrons behave like electromagnetic waves:



What if single electrons are used instead of an electron beam?

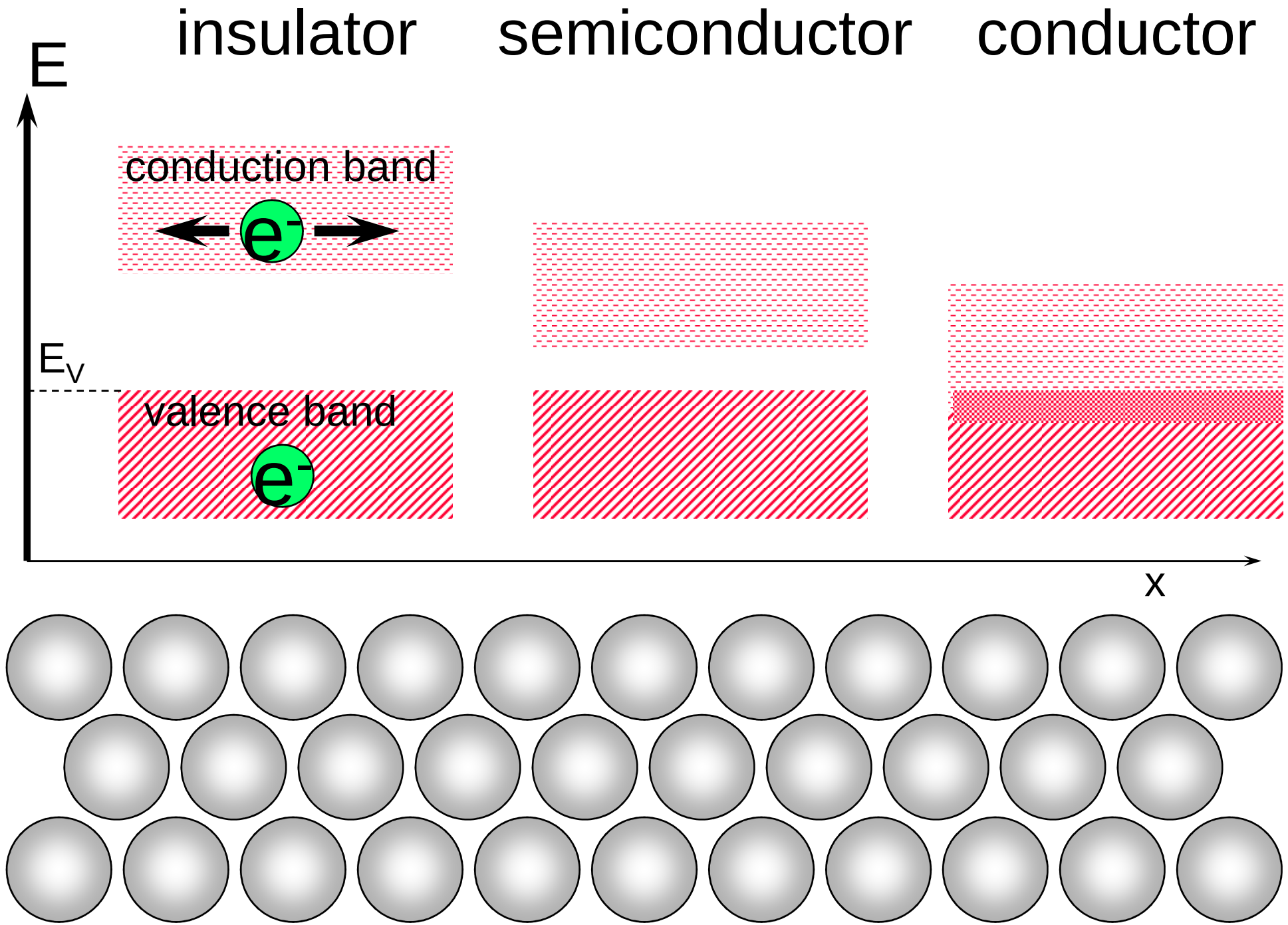
Example: 24 single electrons:

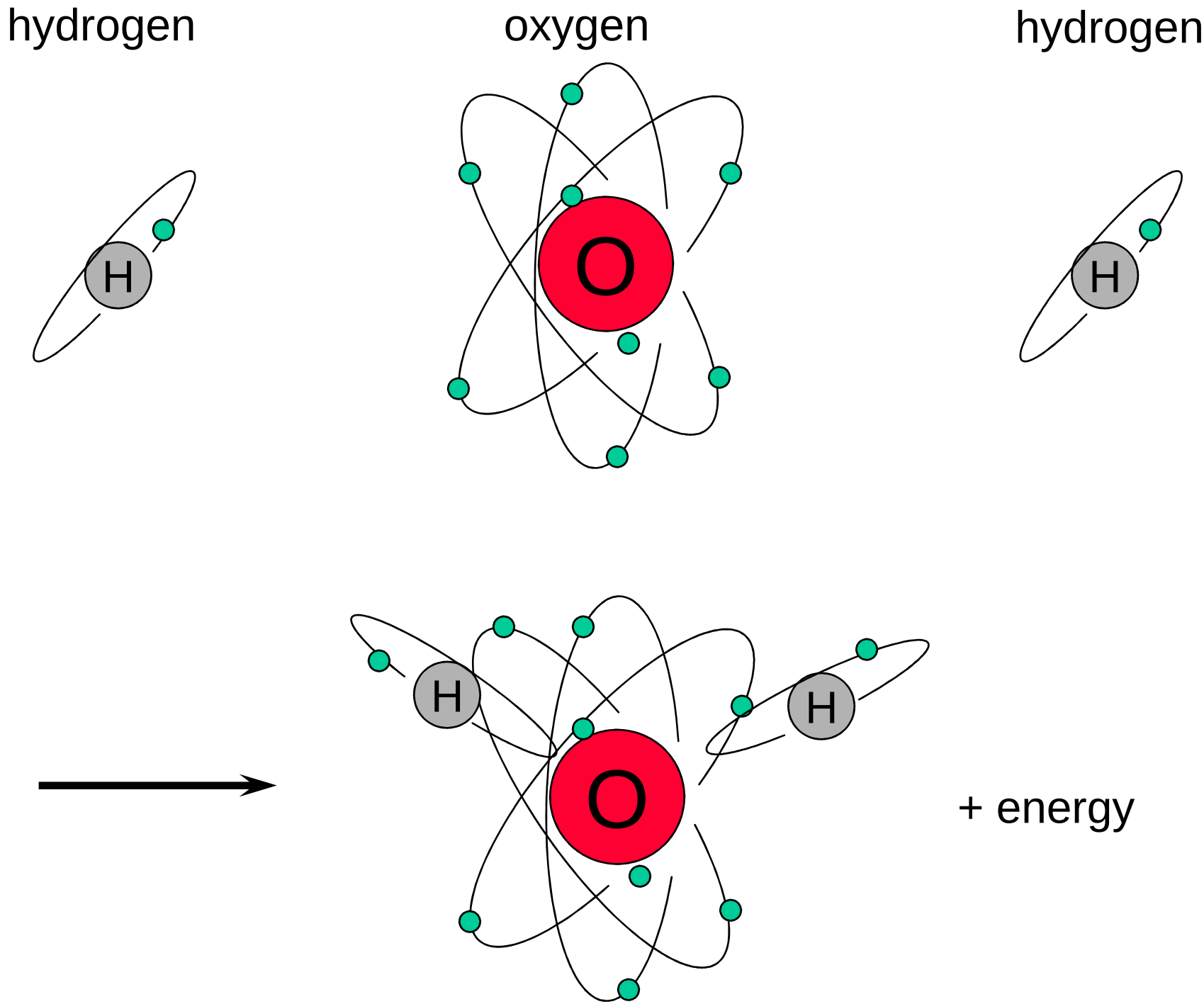


example for a typical count:

2 5 12 4 1

Answer: local intensities of the diffraction pattern are represented by the probabilities to find an electron.


insulator
semiconductor
conductor
E
conduction band
e-
E_V
valence band
e-
x


hydrogen
oxygen
hydrogen
H
O
H
H
O
H
+ energy