DNA analysis by MALDI-TOF mass spectrometry

Matrix

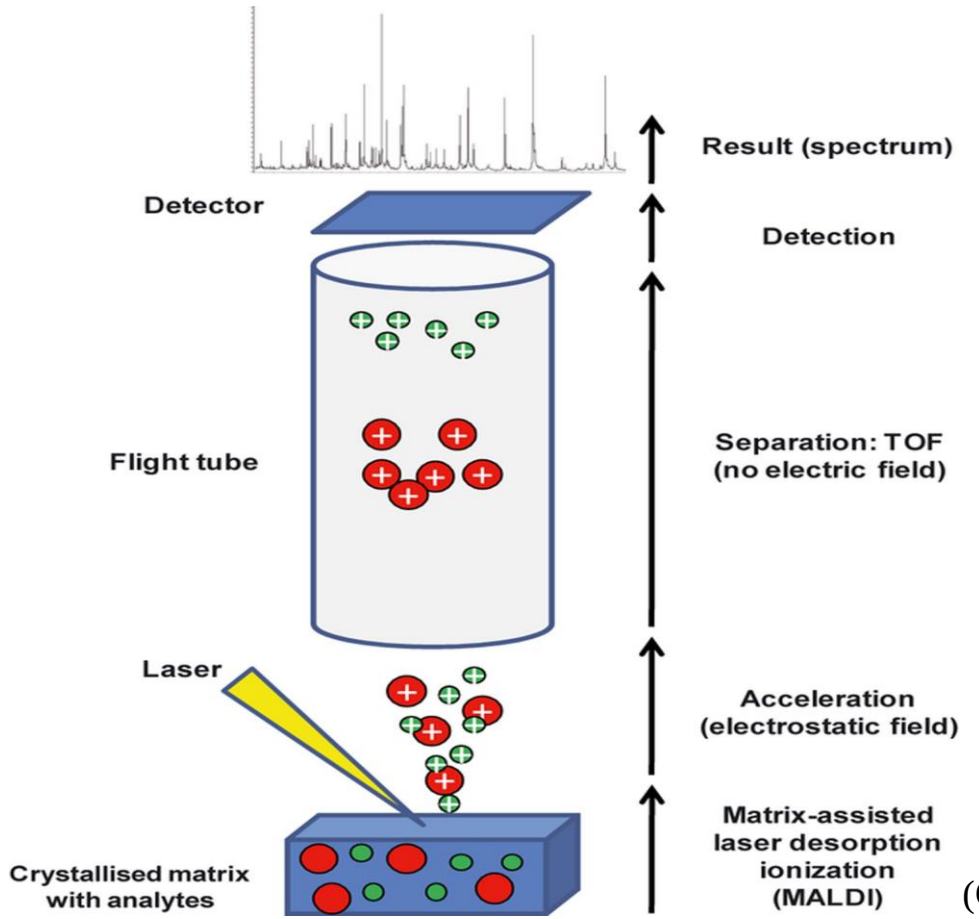
Assisted

Laser

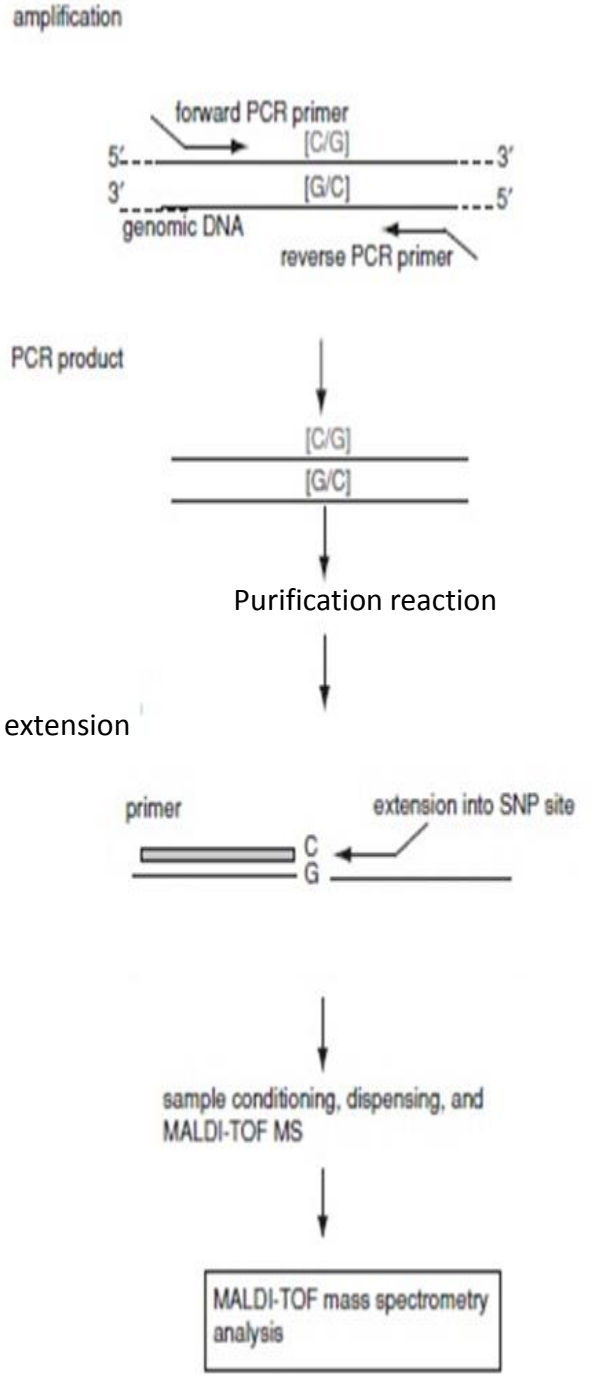
Desorption

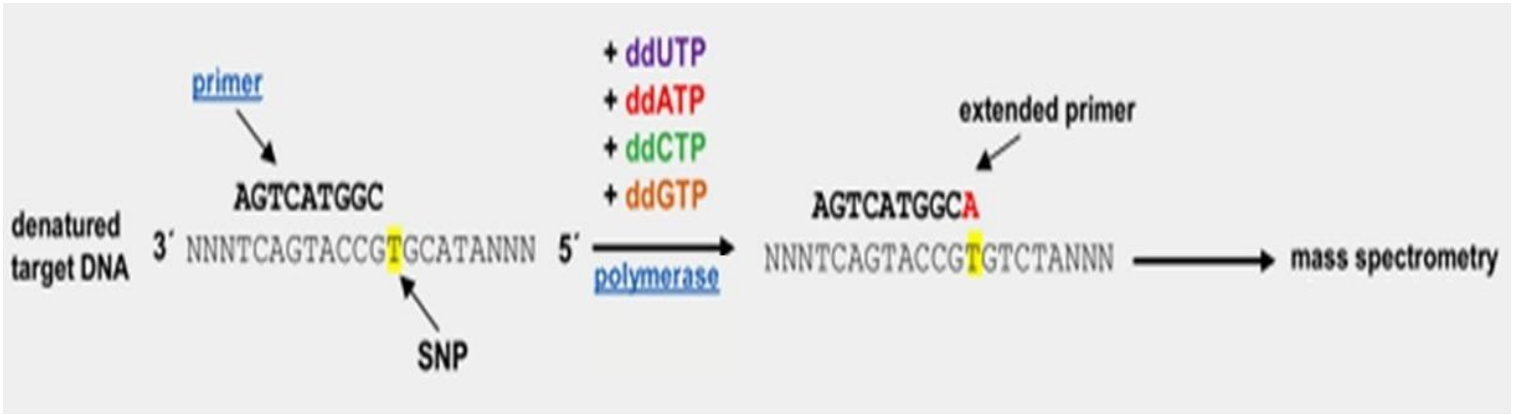
Ionization

Time **O**f **F**light

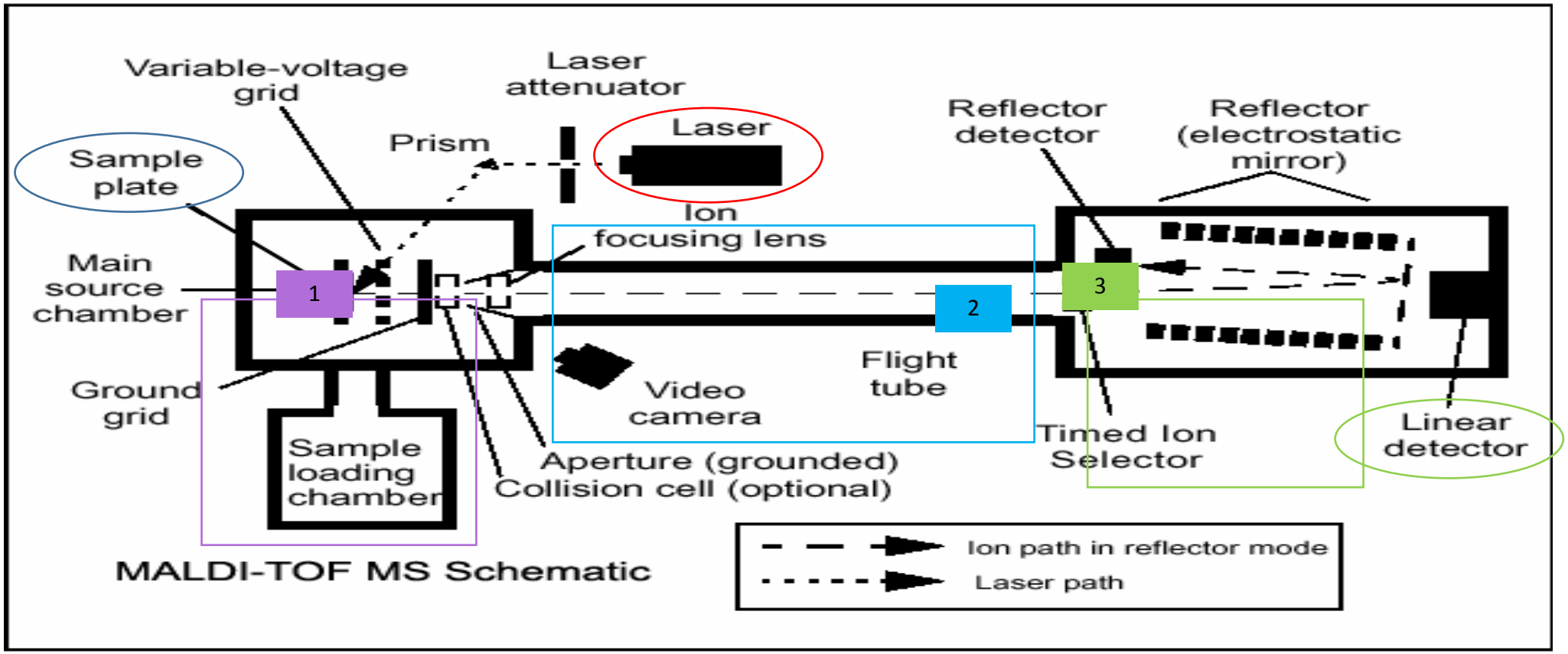


(Croxatto *et al*, 2012)





(Modified from Gabriel *et al*, 2009)



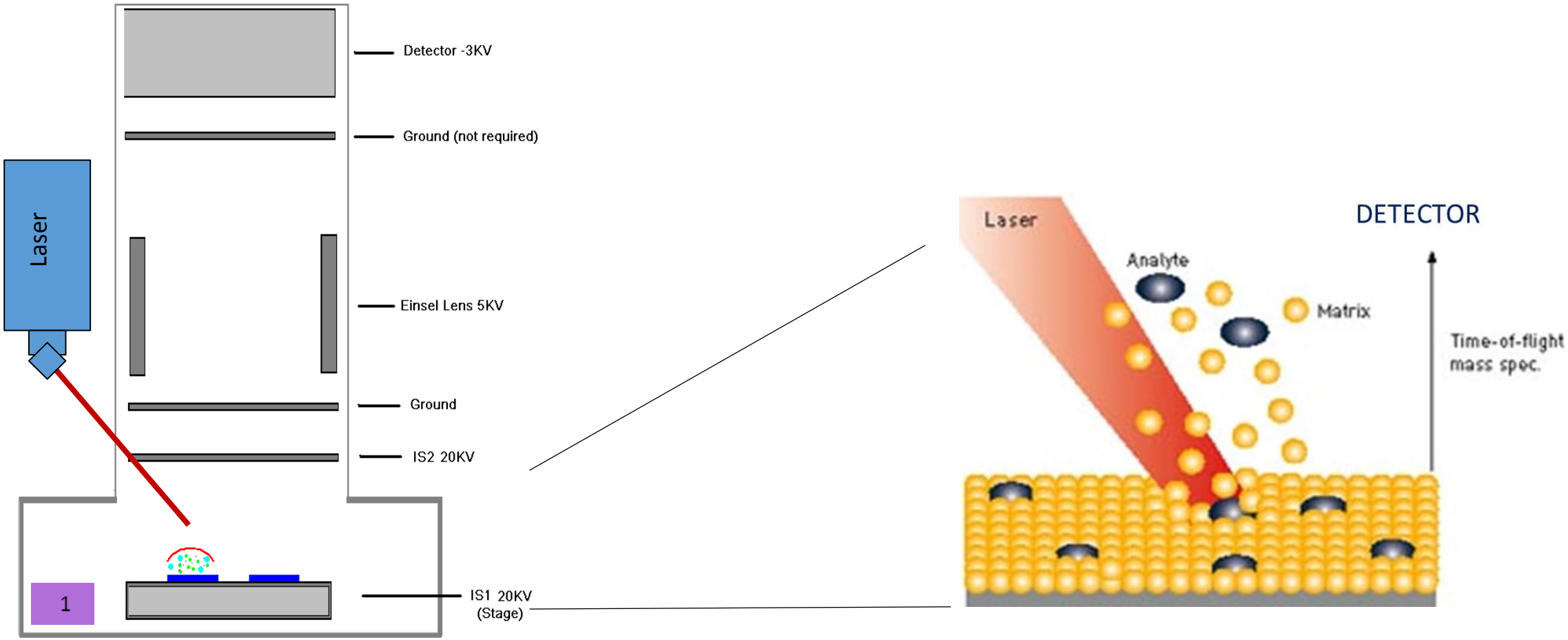
1 **IONIZATION CHAMBER**

2 **ANALYZER**

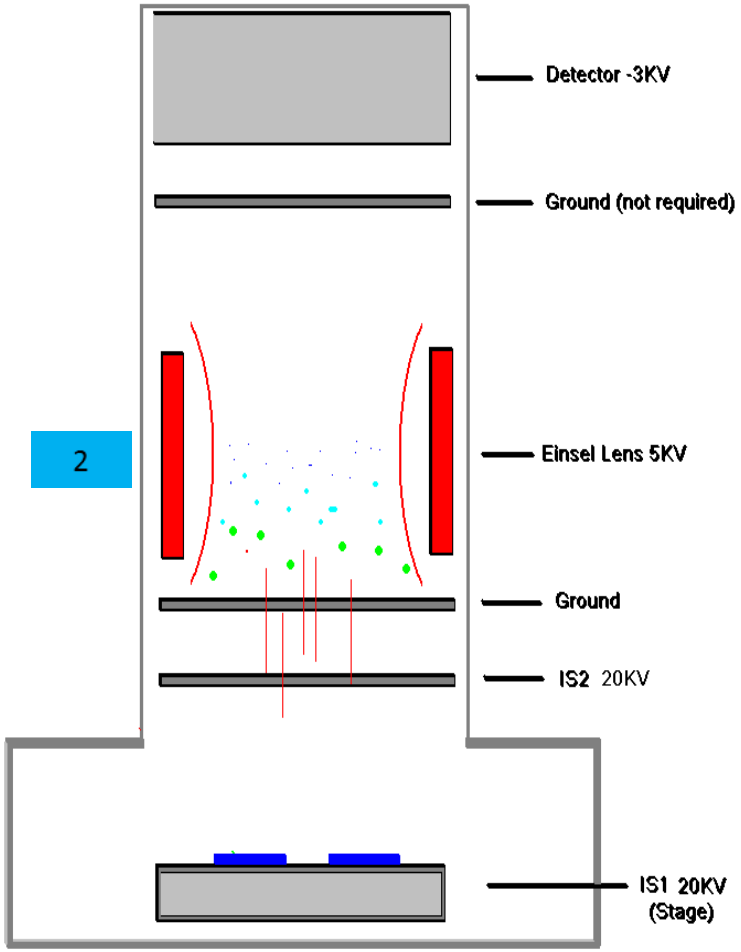
3 **DETECTOR**

IONIZATION CHAMBER:

Ions are generated by a **d**esorbion/**i**onization process **m**atrix **a**ssisted by a **l**aser (MALDI)



ANALYZER:
Based on time of flight (ToF)

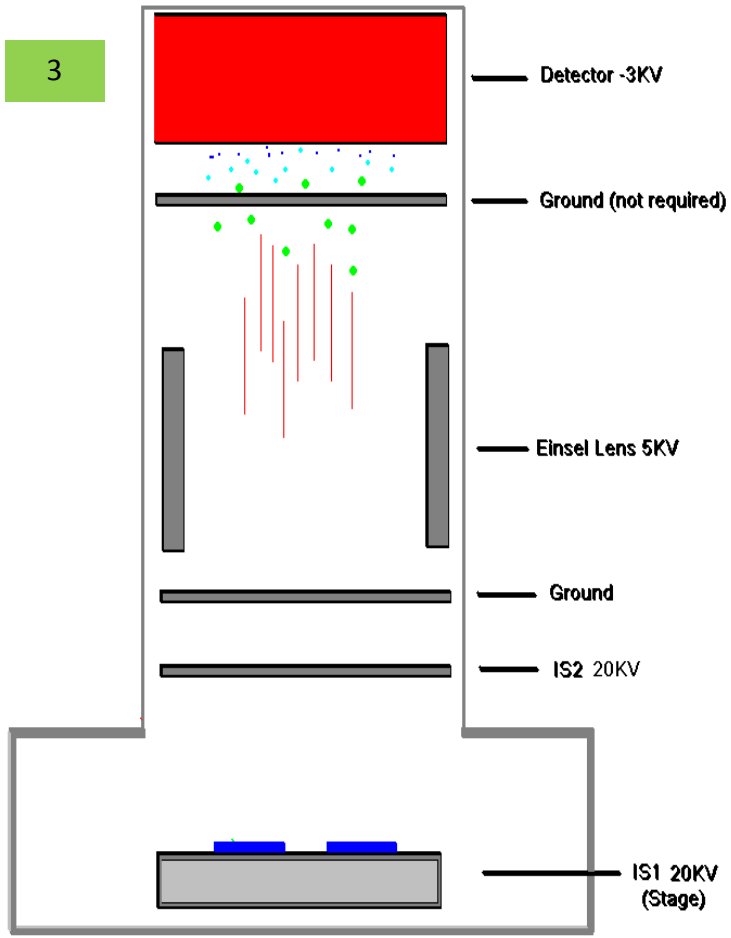


Time of flight of a ion is related to its mass/charge ration m/z

Lighter ions hit the detector first, while the slower traveling heavier ions hit the detector later

DETECTOR:
Ions are multiplicated in electrons, futher used to obtain an electric signal

3

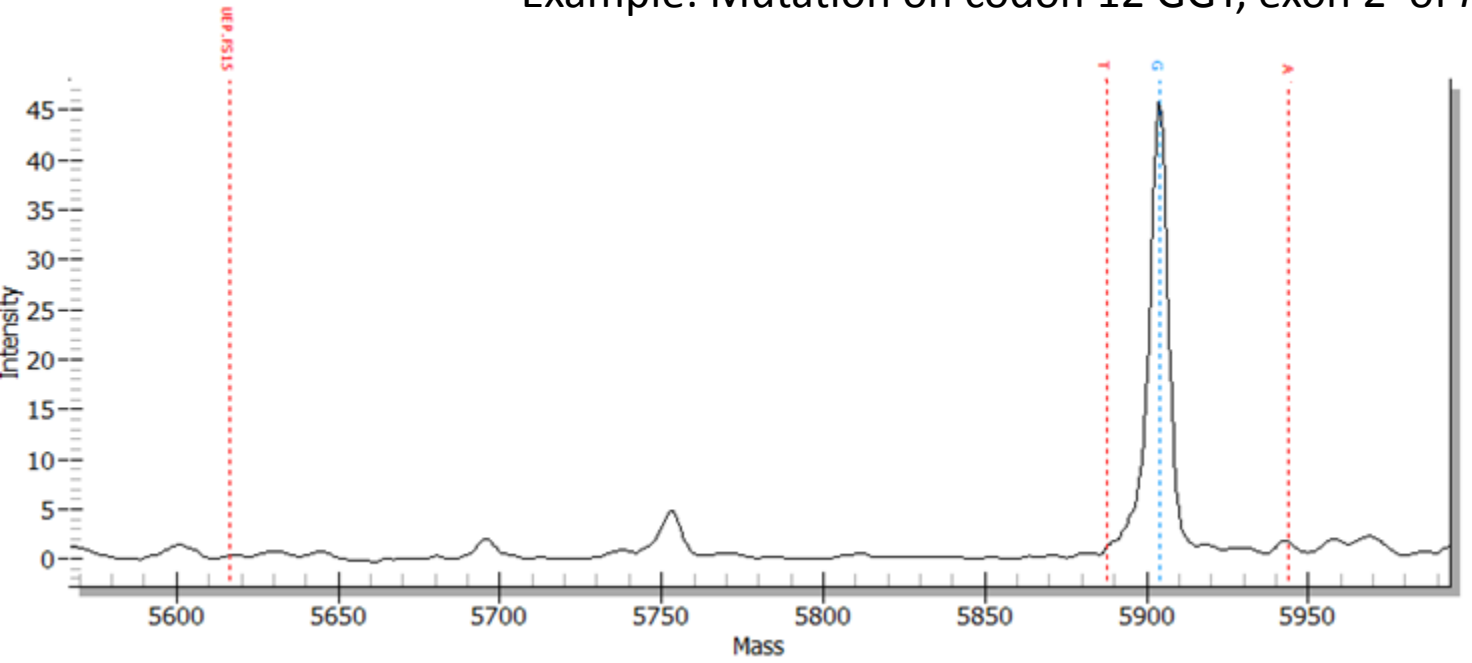


1. Each ion reaches the detector and 1-3 electrons will be released

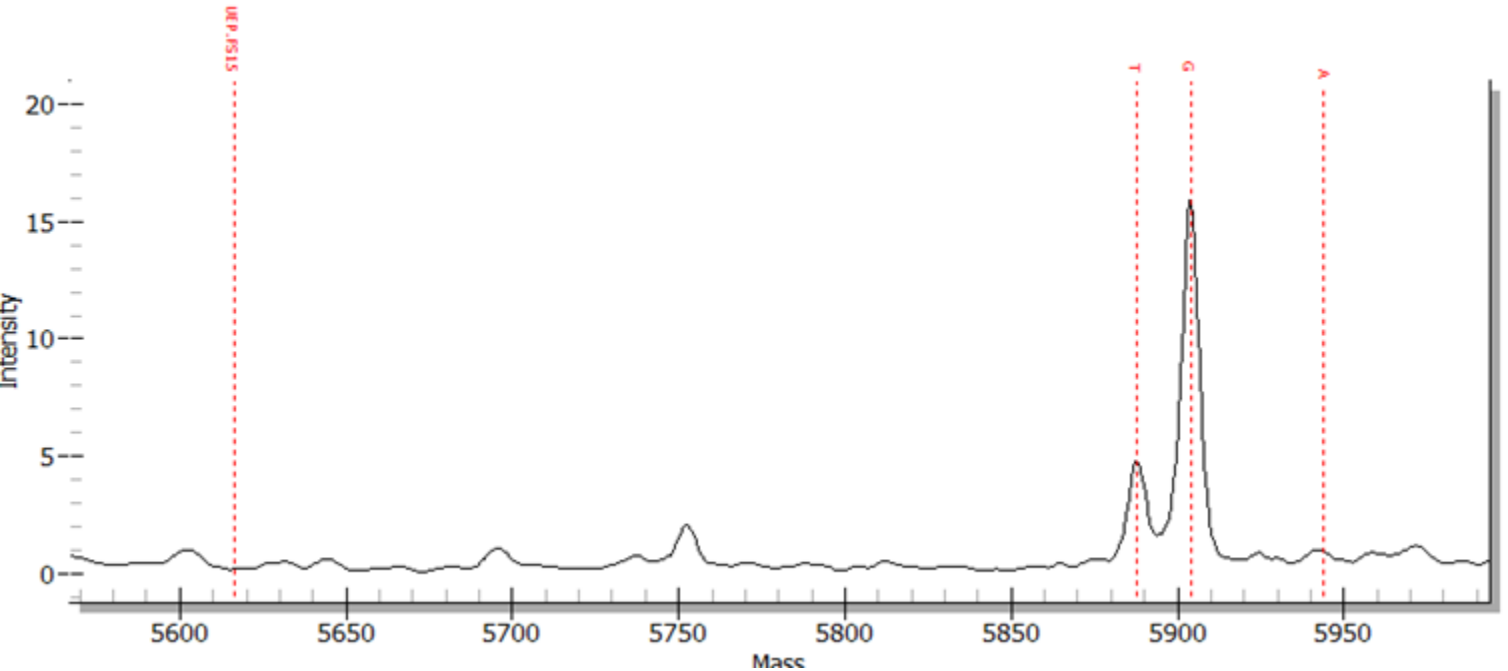
2. Electrons move into another plate and 1-3 new electrons will be released (secondary emission)

1. This process will be repeated many times,leading to a signal amplification→digital signal visible in real time on the computer.

Example: Mutation on codon 12 GGT, exon 2 of *KRAS* gene



Mass spectrometer analysis graph, with an expected peak (G), as in wild-type sequence GGT.



Mass spectrometer analysis graph, with an expected peak (G) and an unexpected peak (T) representing c.34G>T transversion mutation GGT>TGT