

Víctor López Flores



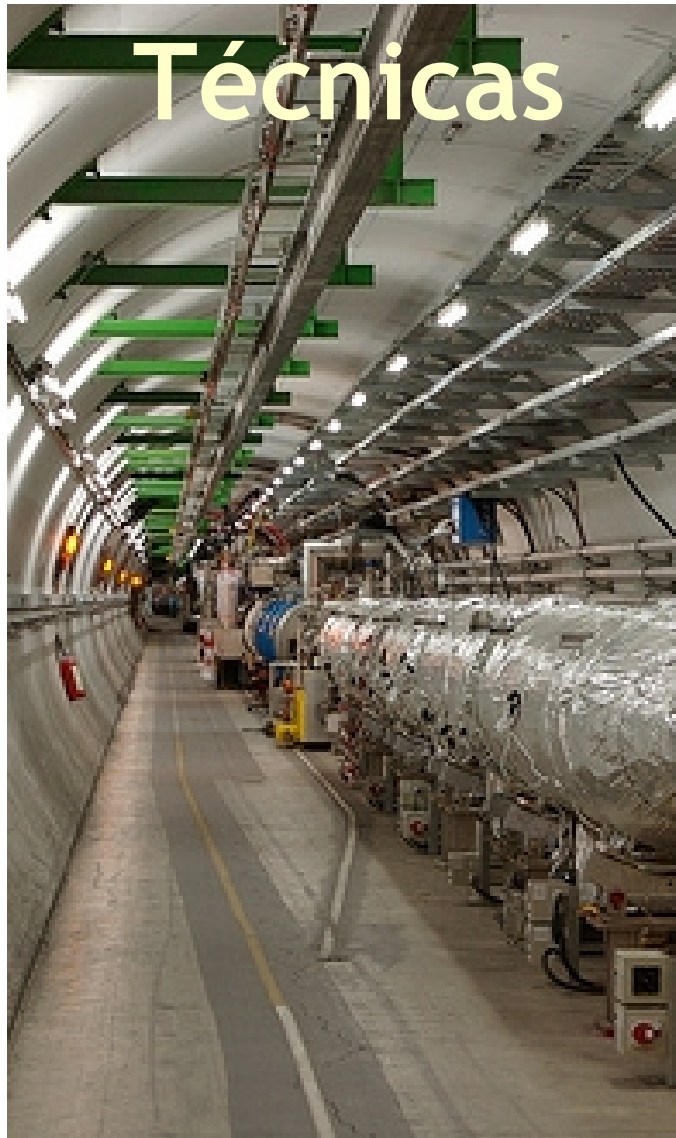
Experimentos resueltos en tiempo*

*en un
sincrotrón

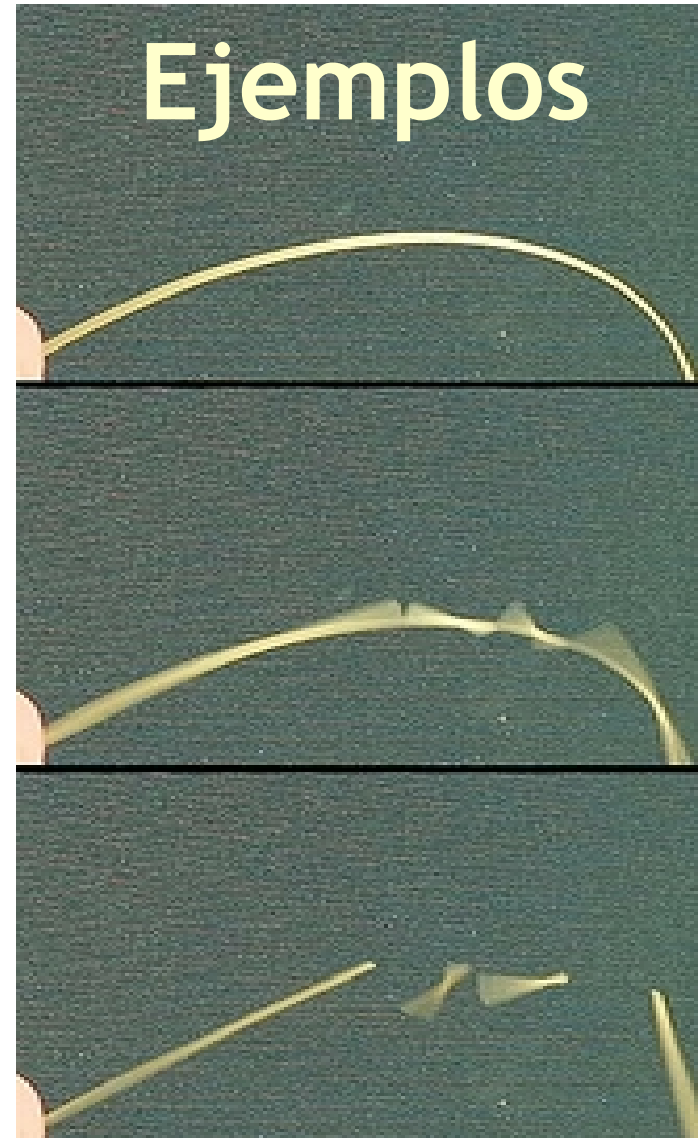
Introducción



Técnicas



Ejemplos

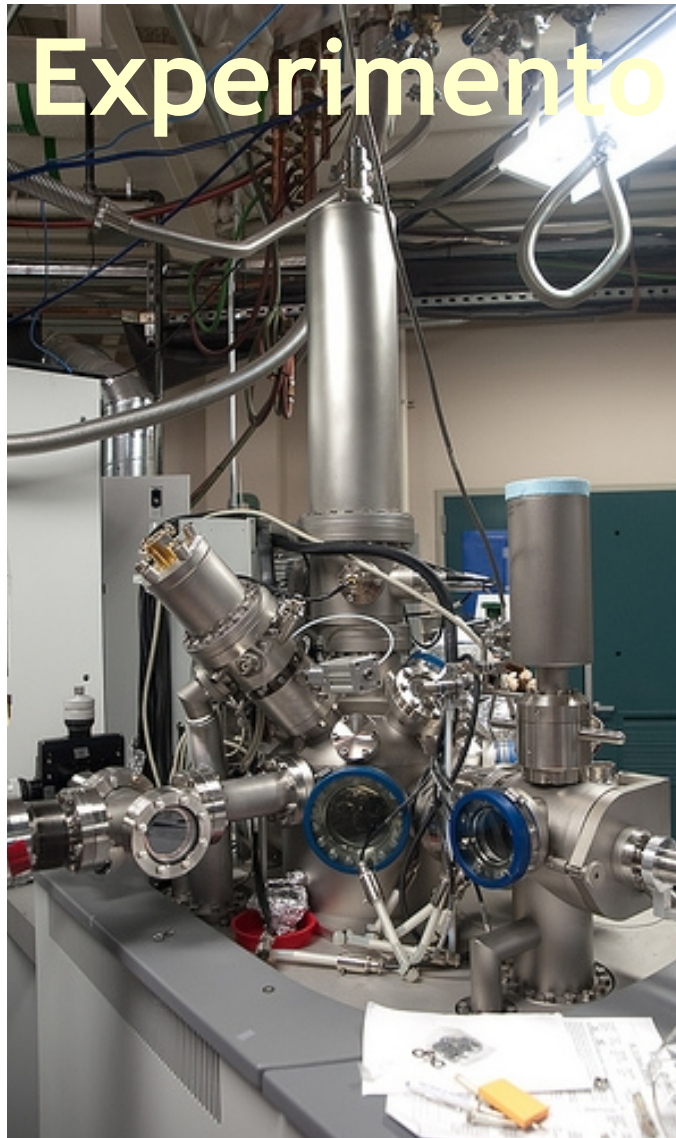


Ejemplos

Fenómeno



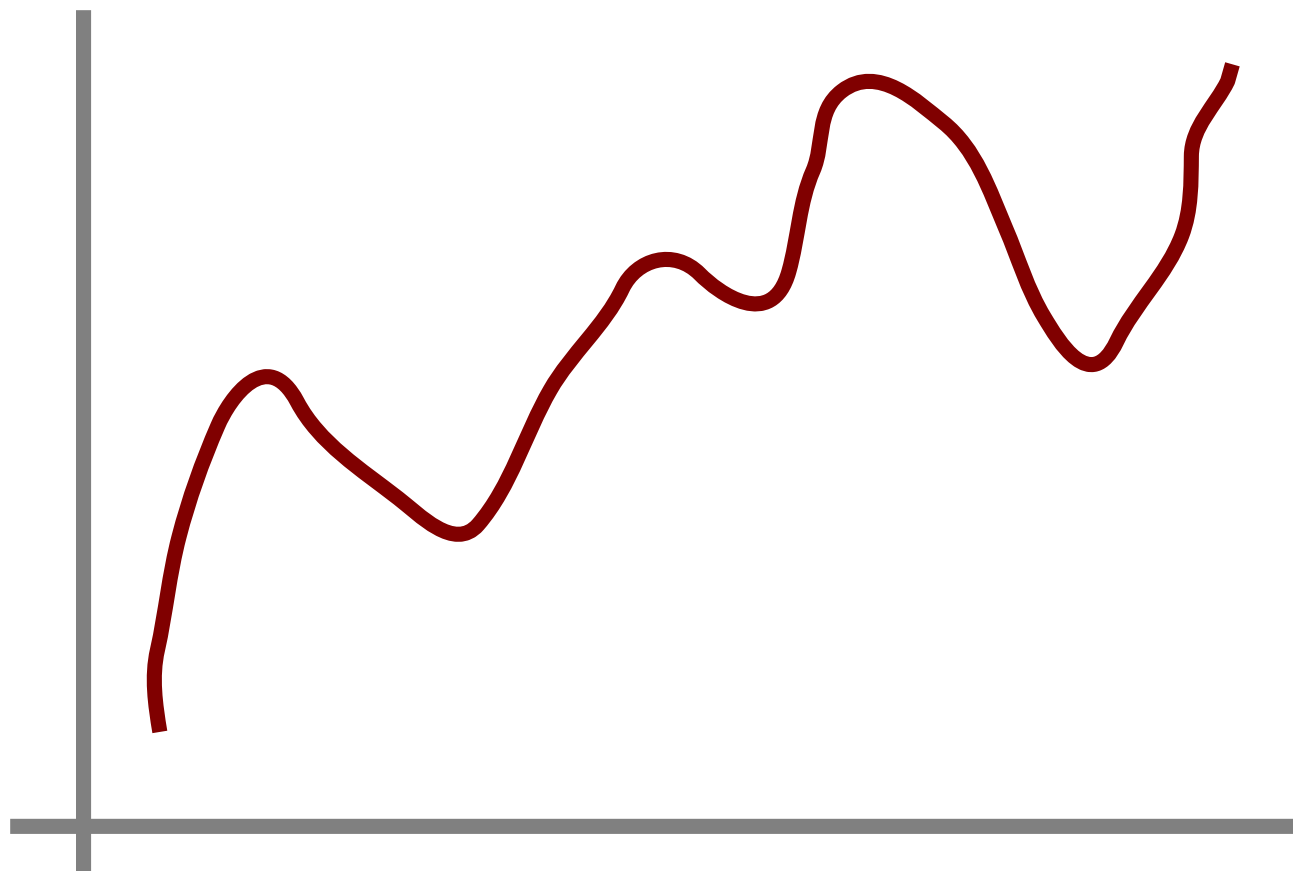
Experimento



Resultados



Fenómeno



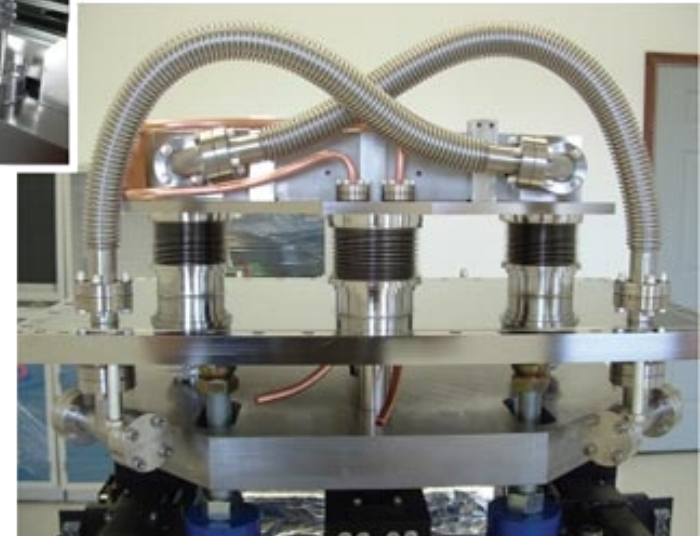
Tiempo

τ (medida) $<$ τ (fenómeno)



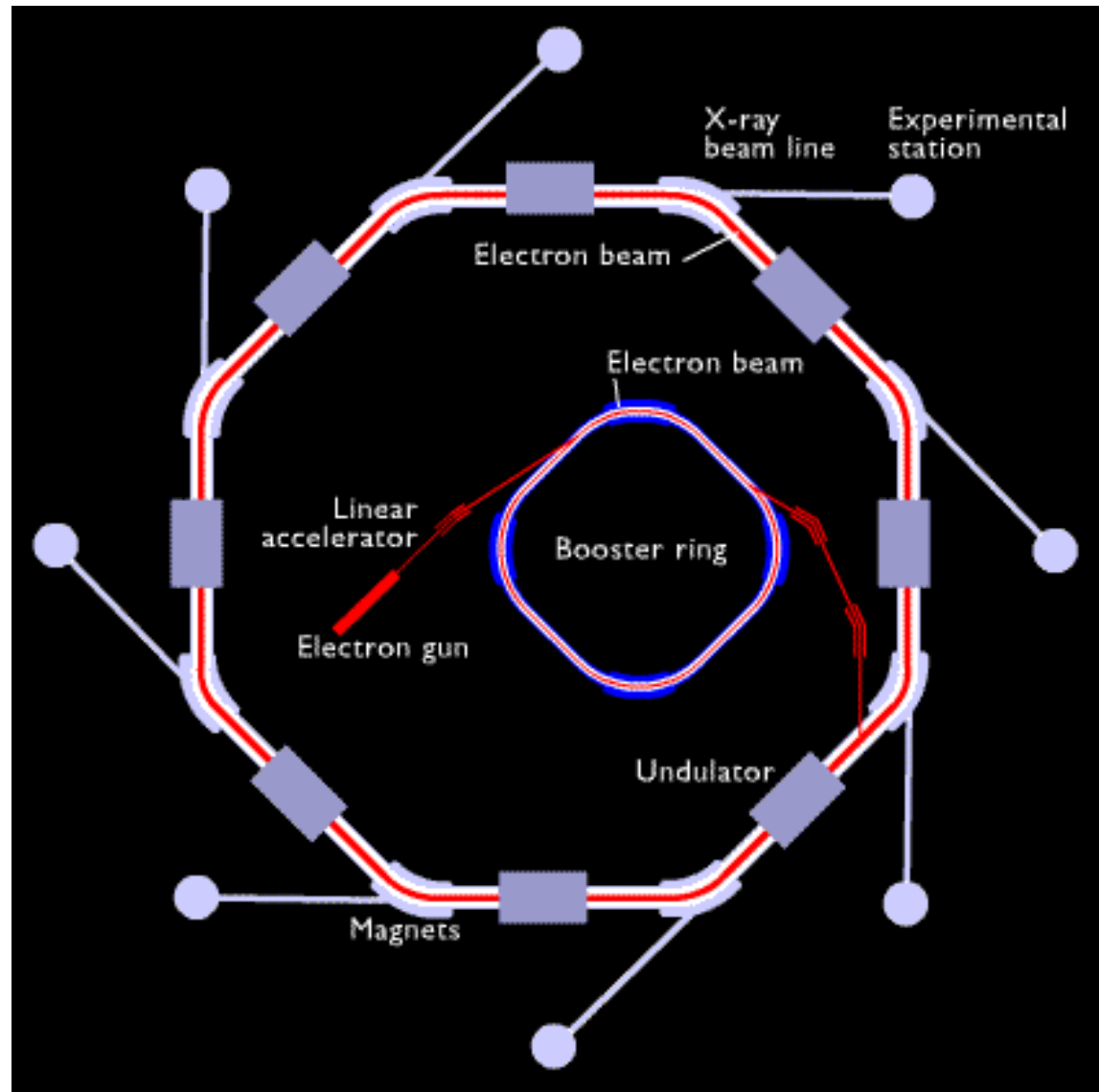
τ (medida)

> 1 μ s Instrumentos

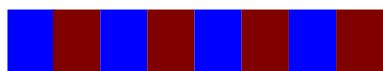


< 1 μ s

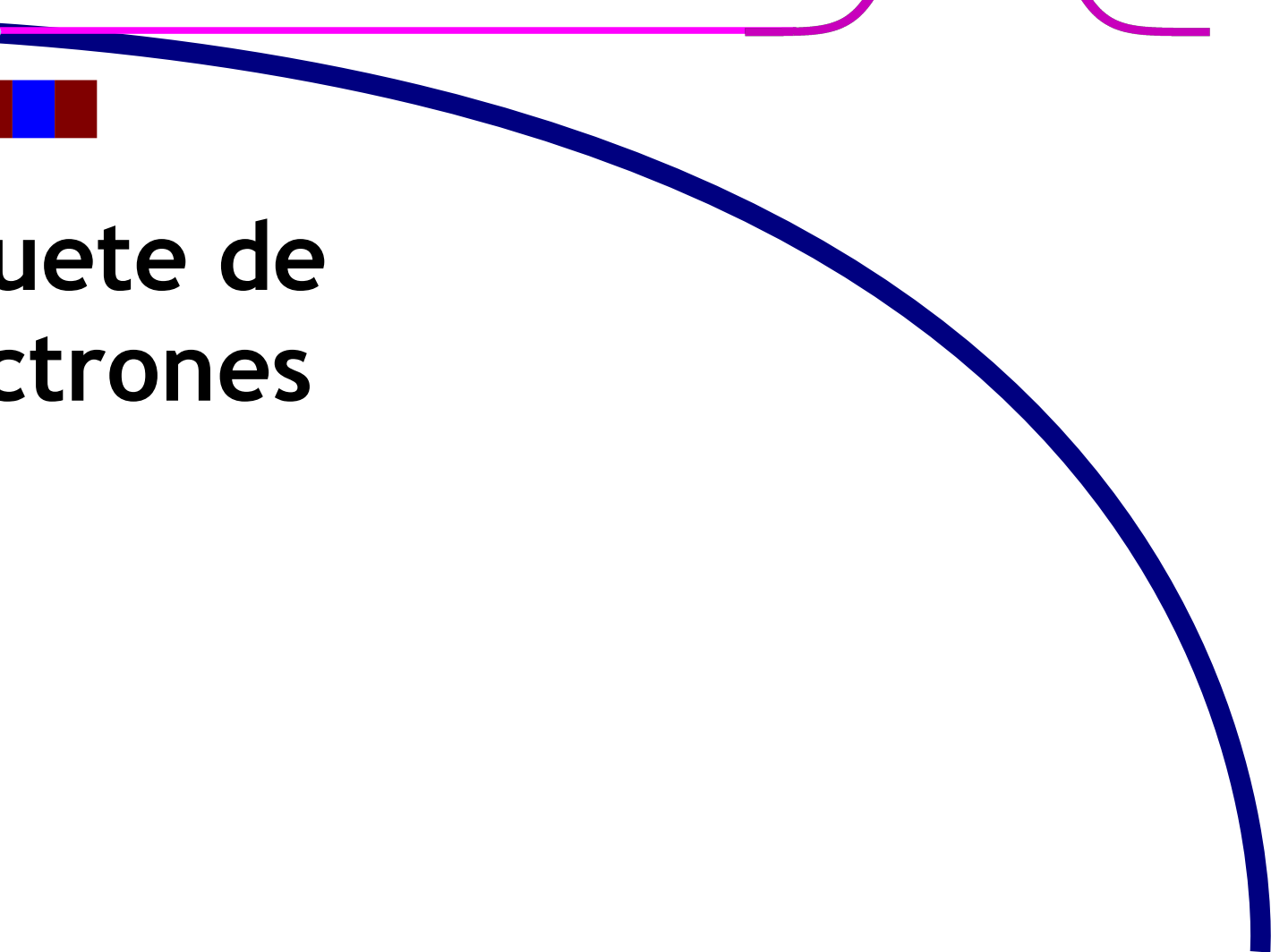
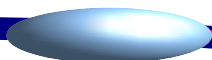
Fuente



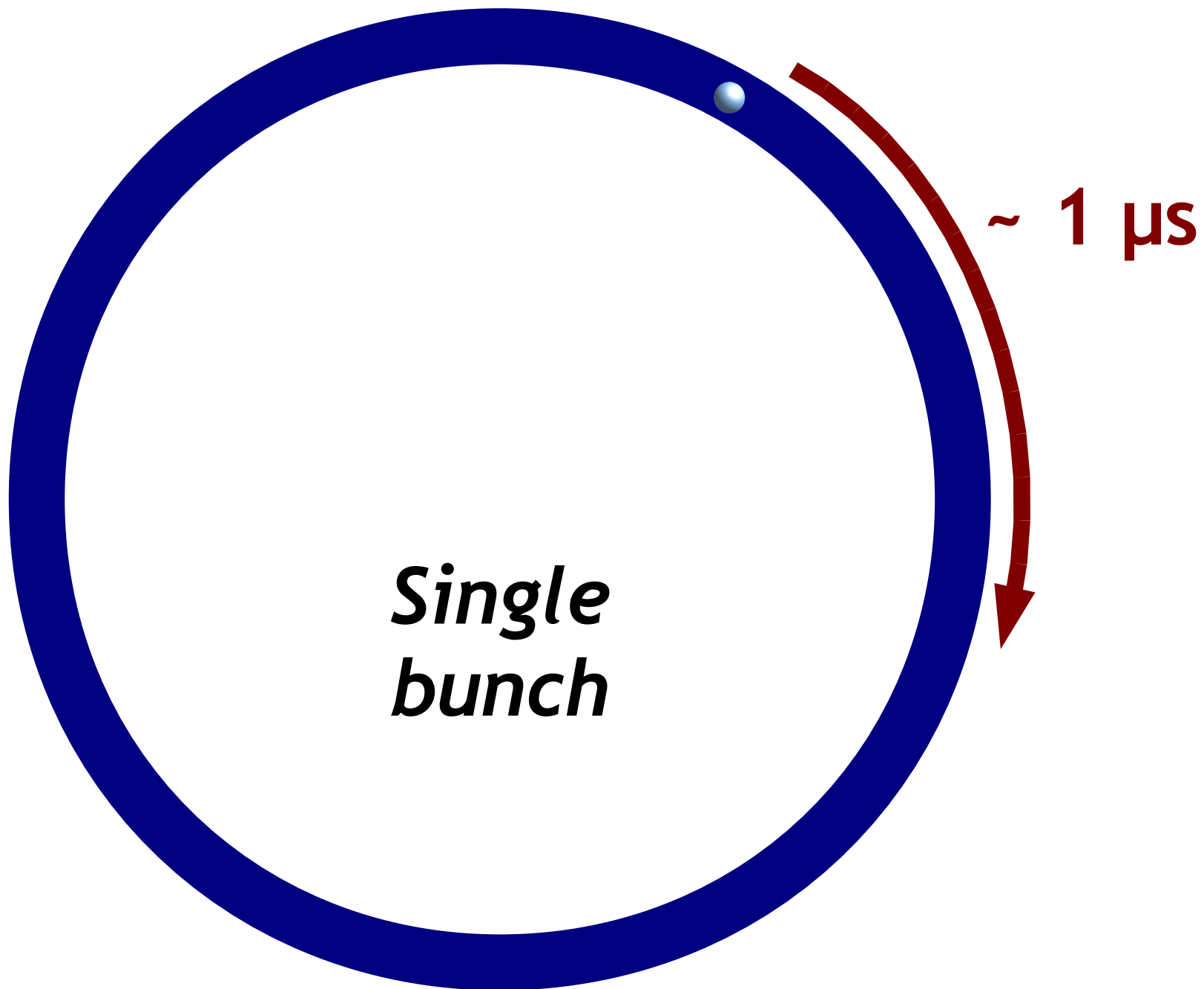
Imanes

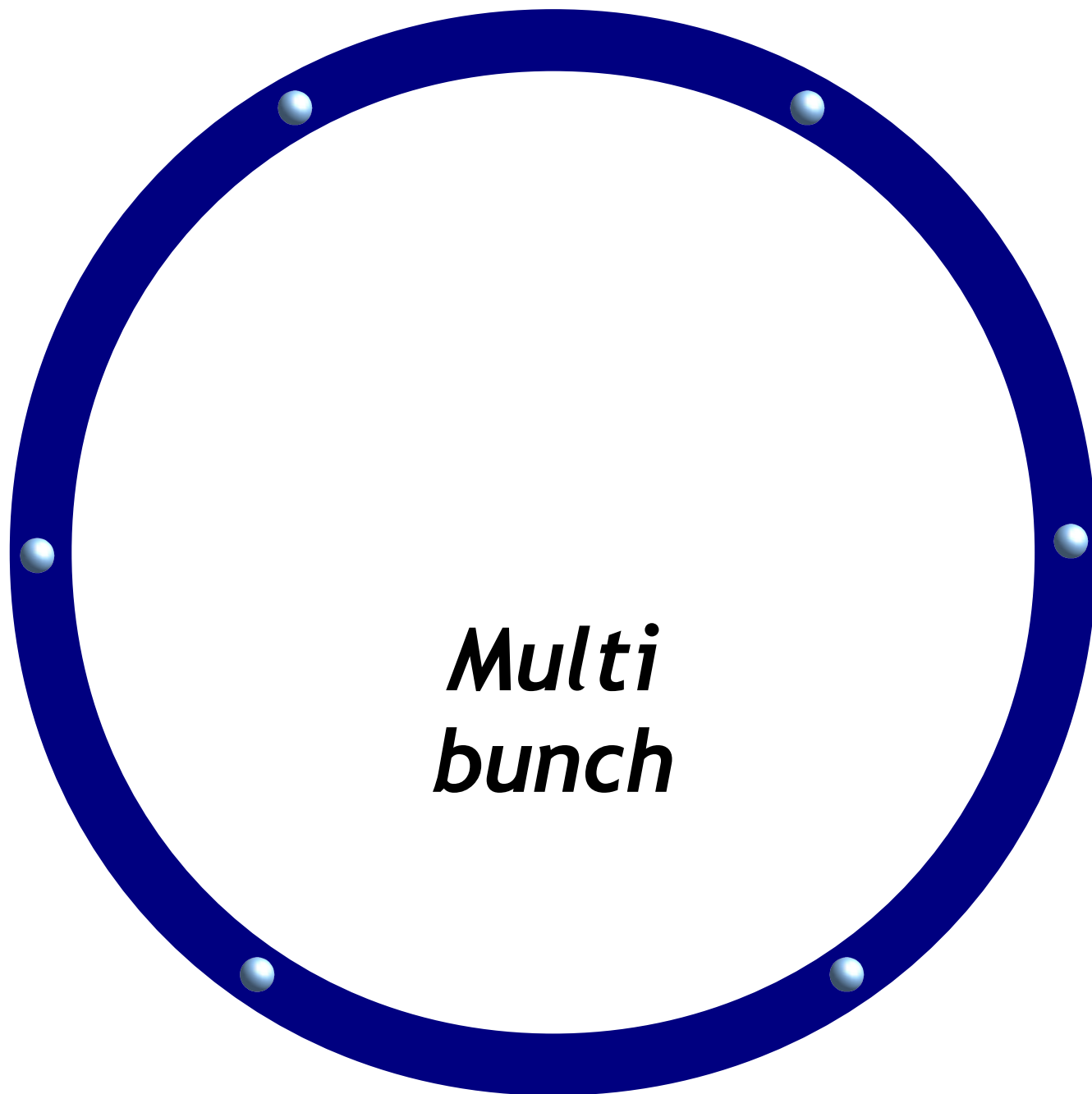


**Paquete de
electrones**

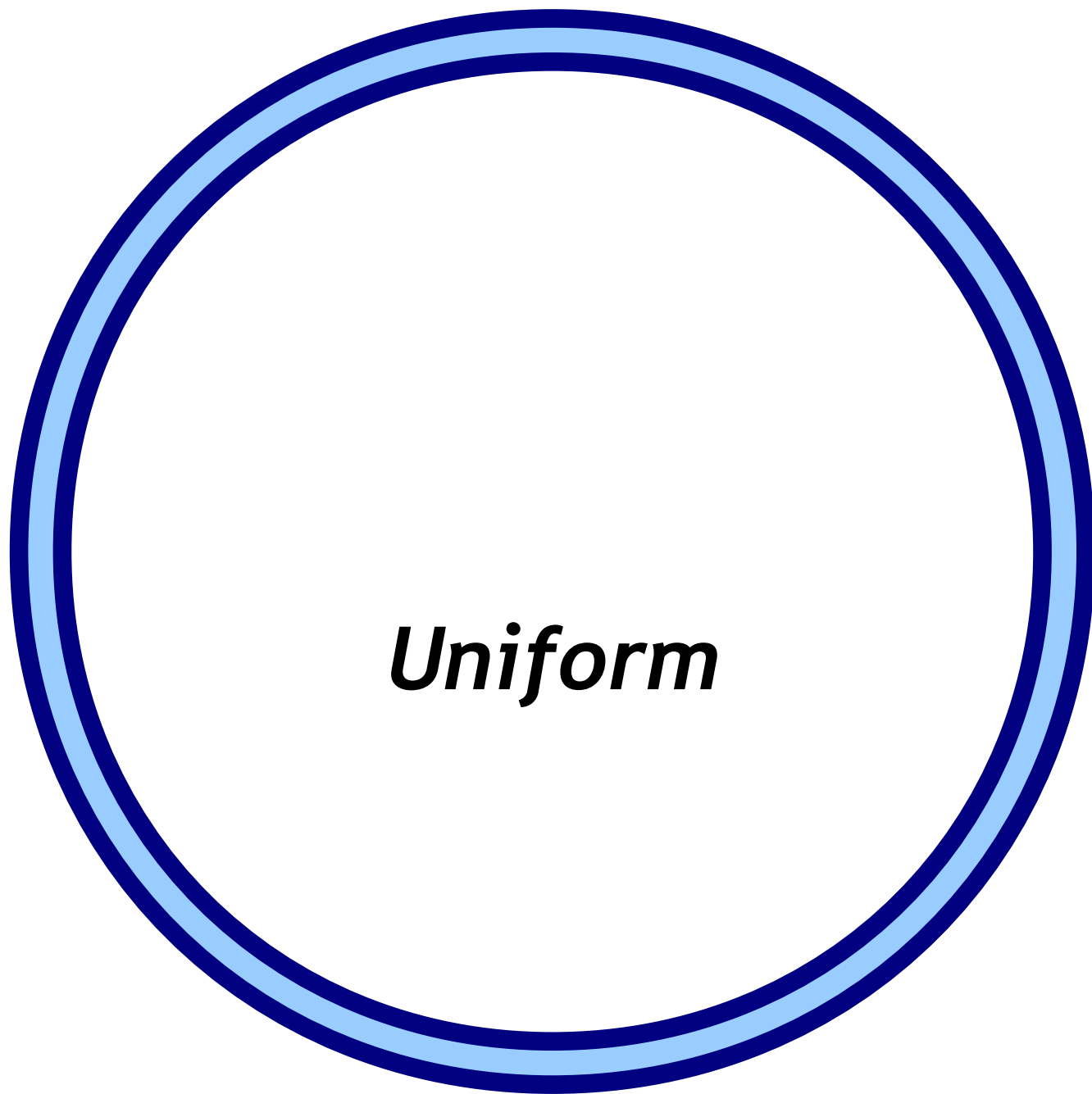


Rayos X

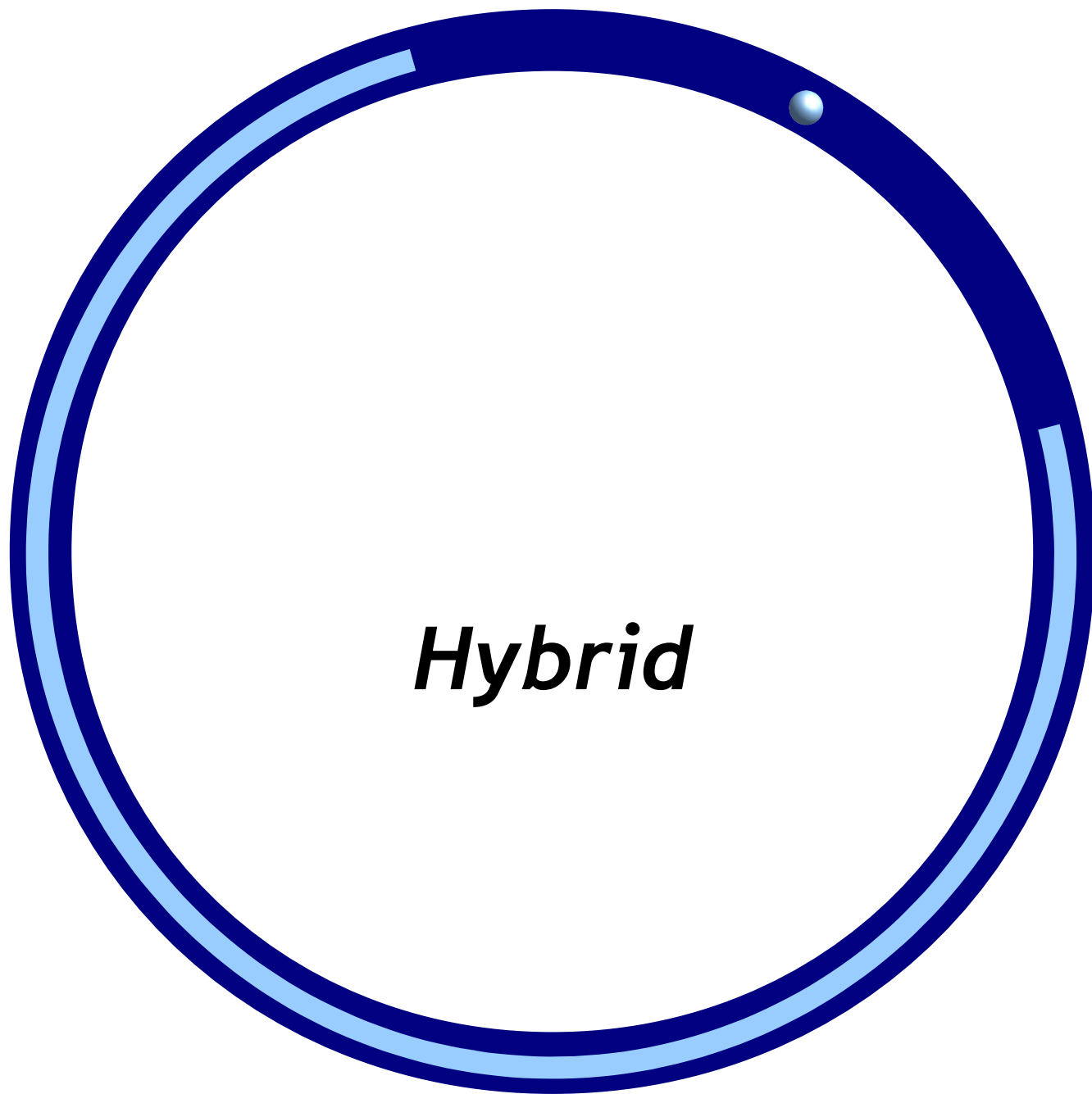




***Multi
bunch***

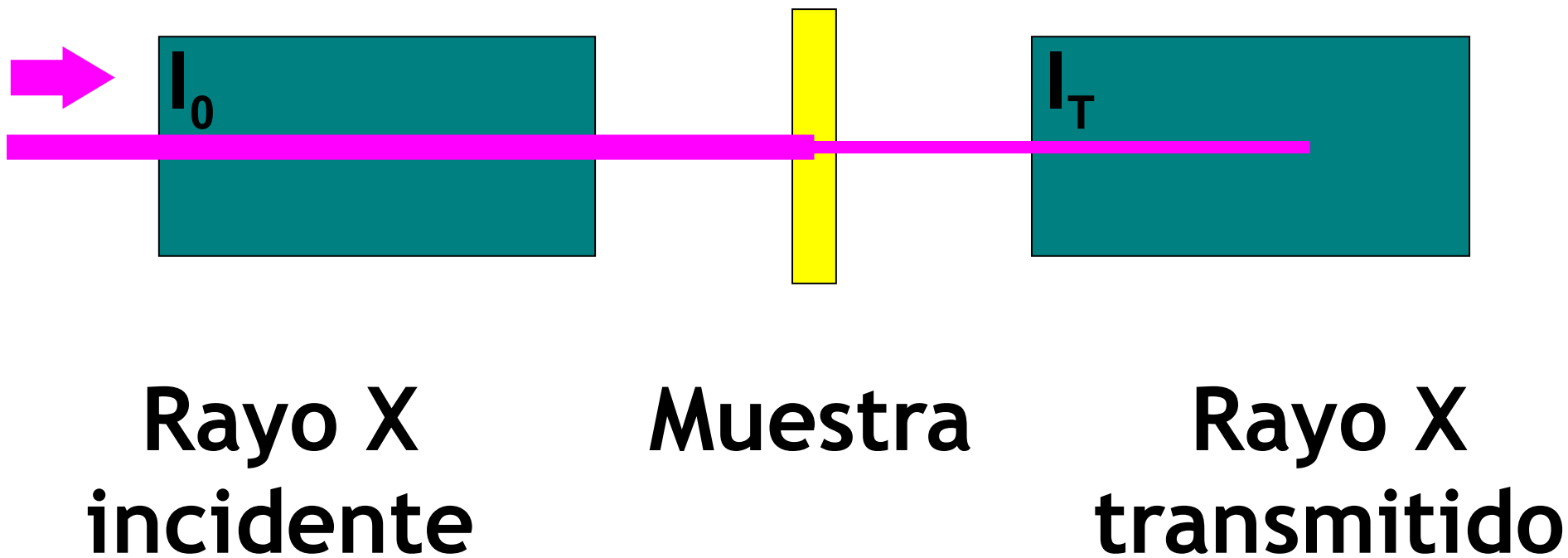


Uniform

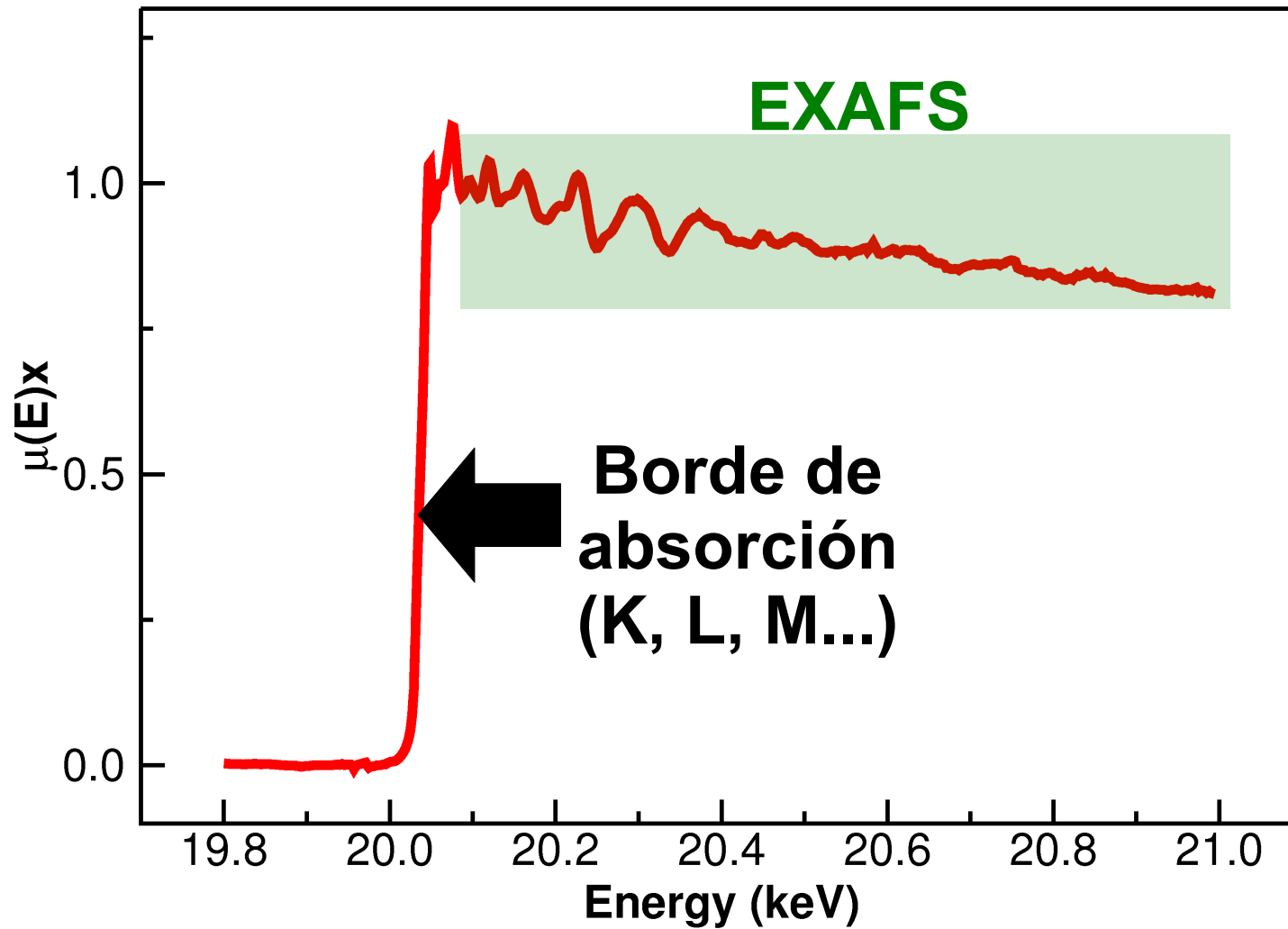


Técnicas

EXAFS



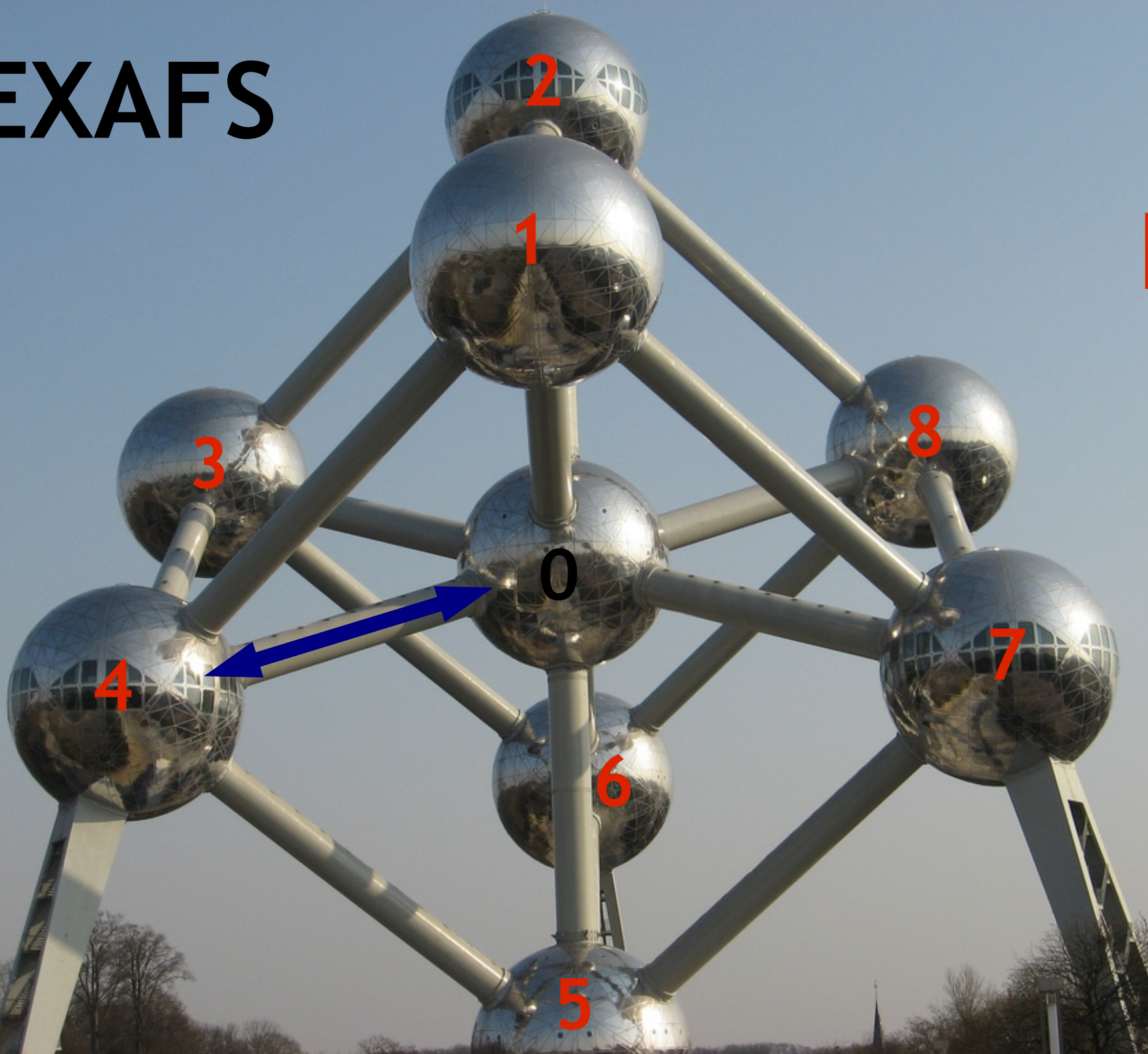
EXAFS



EXAFS

R

N

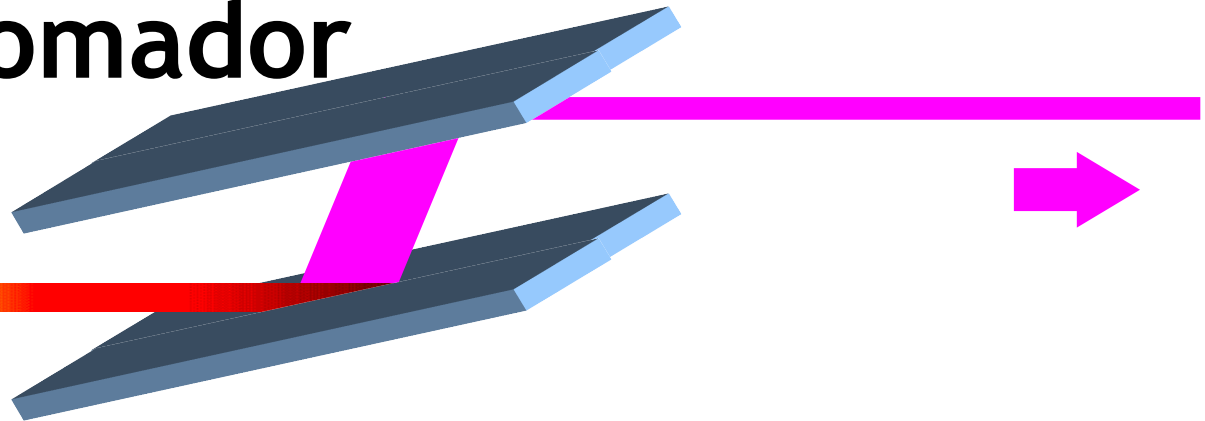


**Radiación
sincrotrón**

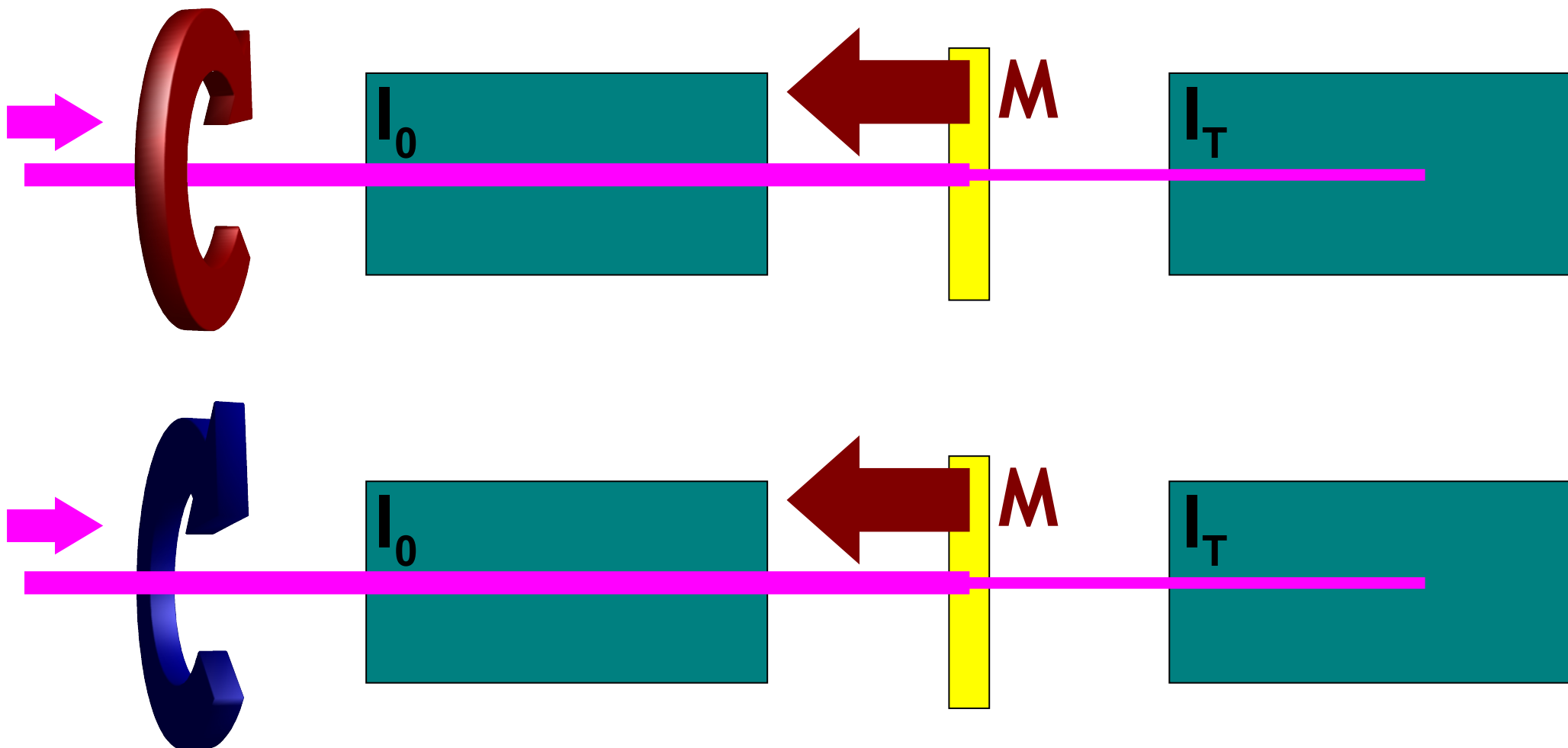
Monocromador

**Rayo X
monocromático**

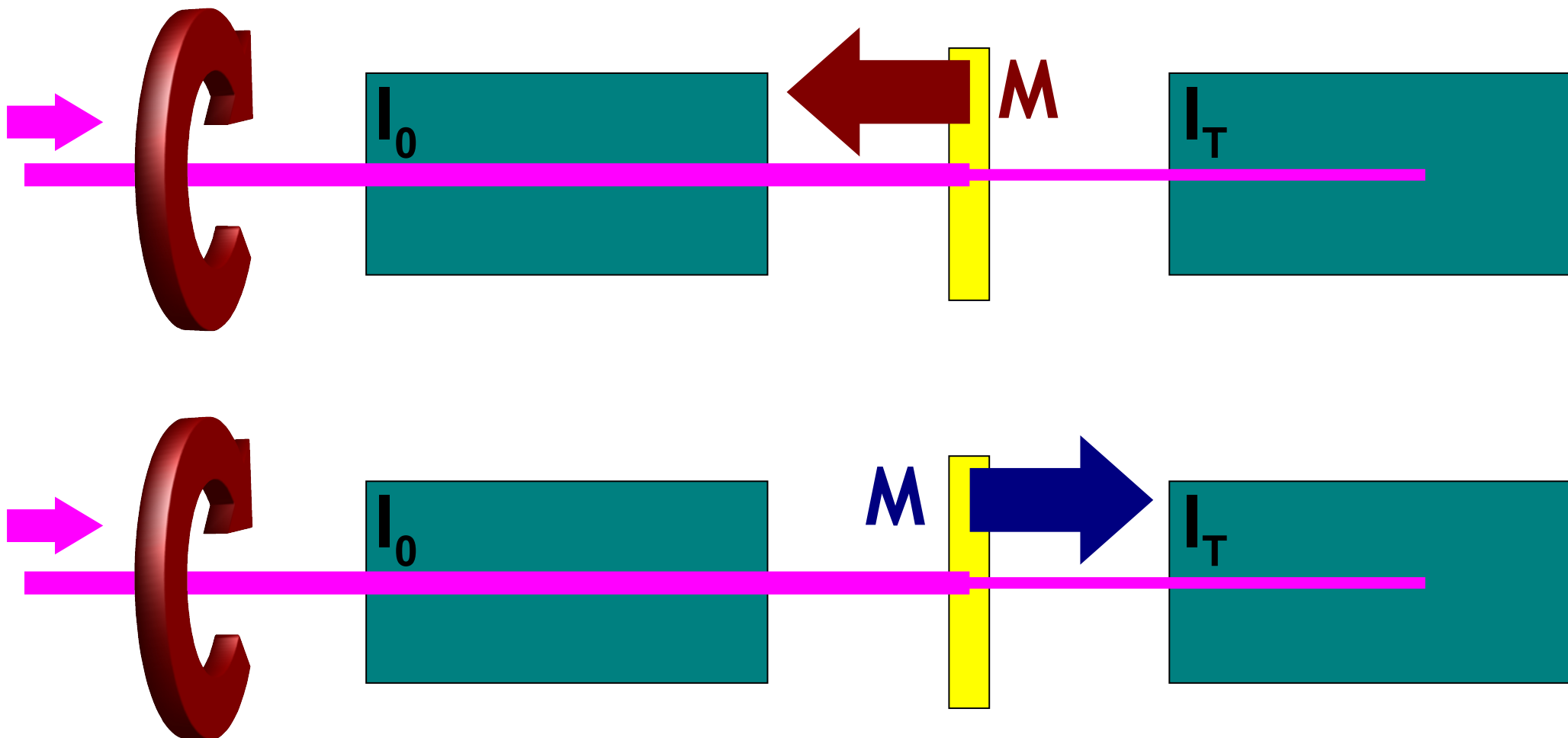
~ 1-20 min



XMCD

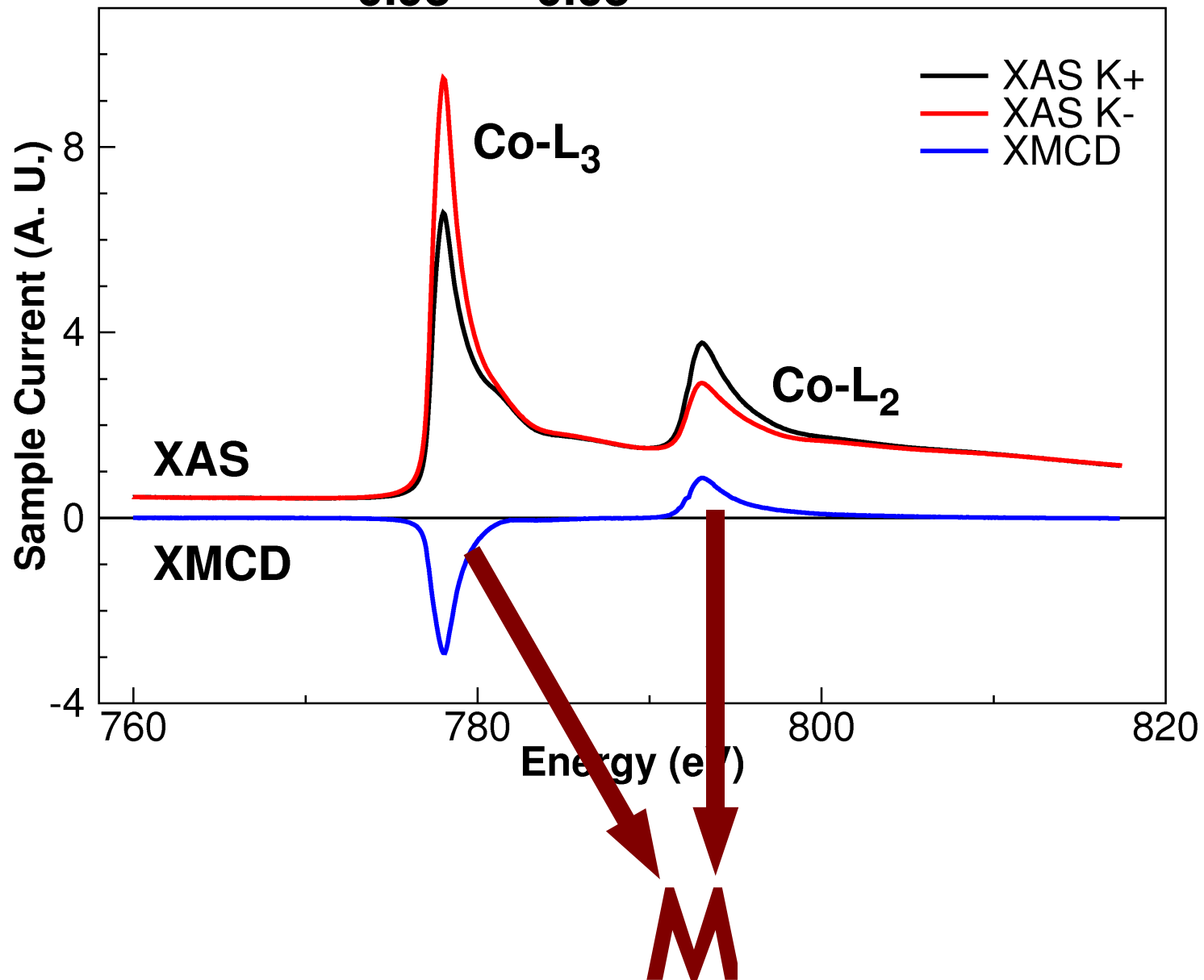


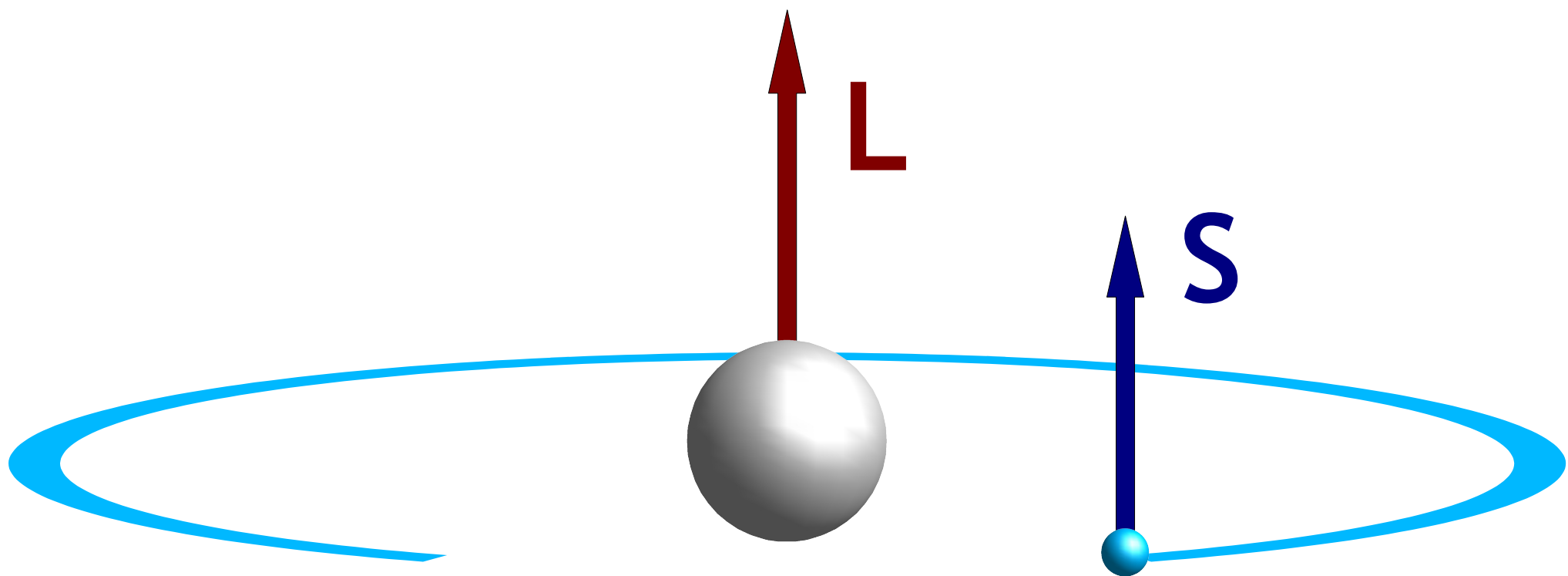
XMCD

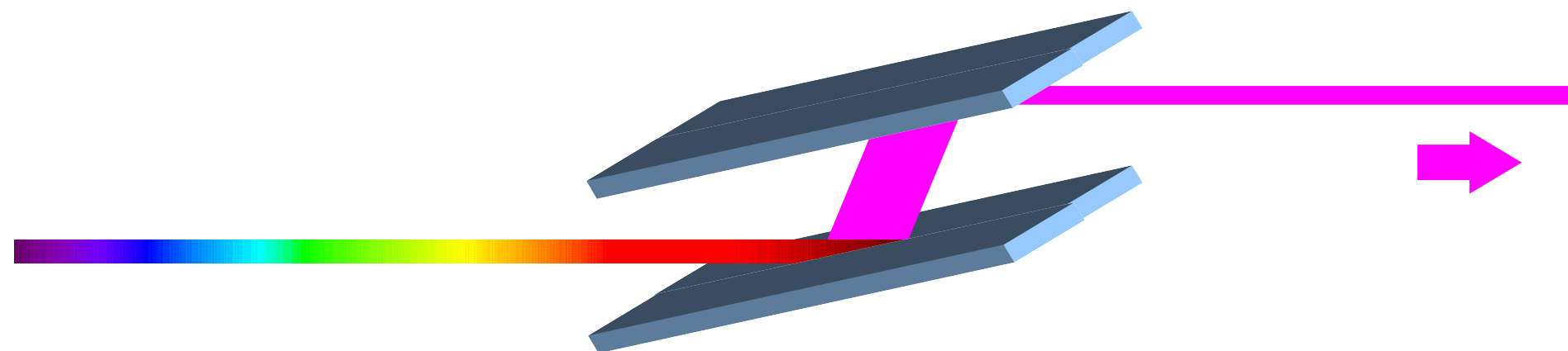


XMCD

$\text{Co}_{0.95}\text{Gd}_{0.05}$ (11 nm film)







~ 1-20 min

Ejemplos

(1)

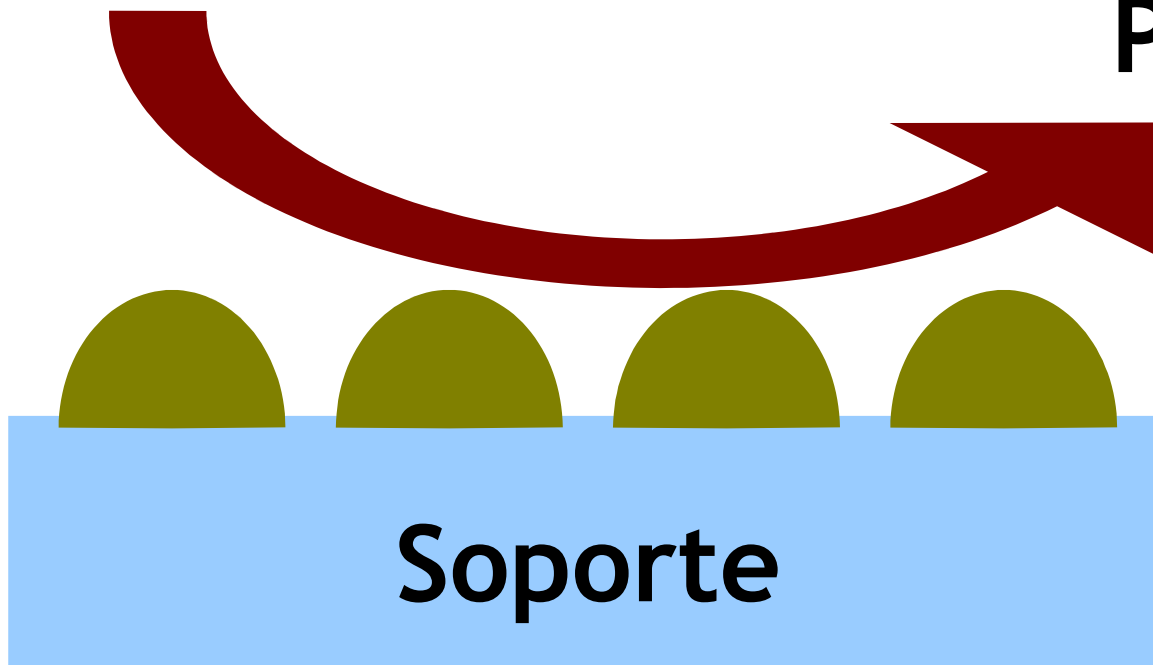
Dinámica del **tamaño** de la fase activa de un catalizador heterogéneo

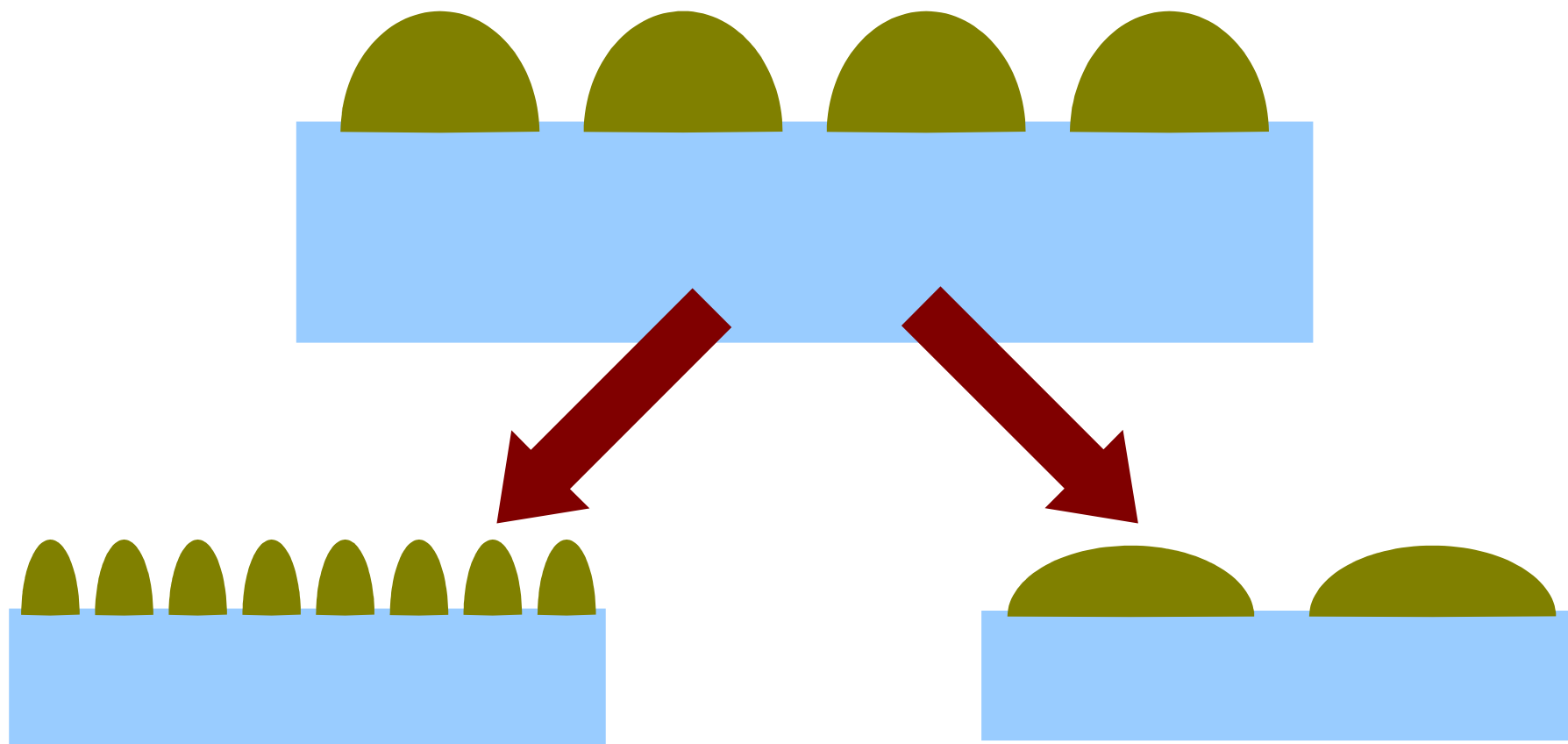
Reactivos

Productos

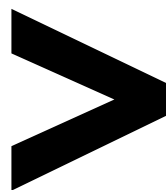
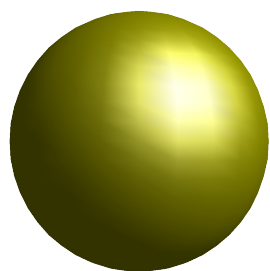
Fase activa

Soporte

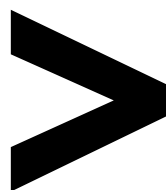




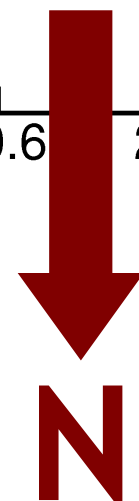
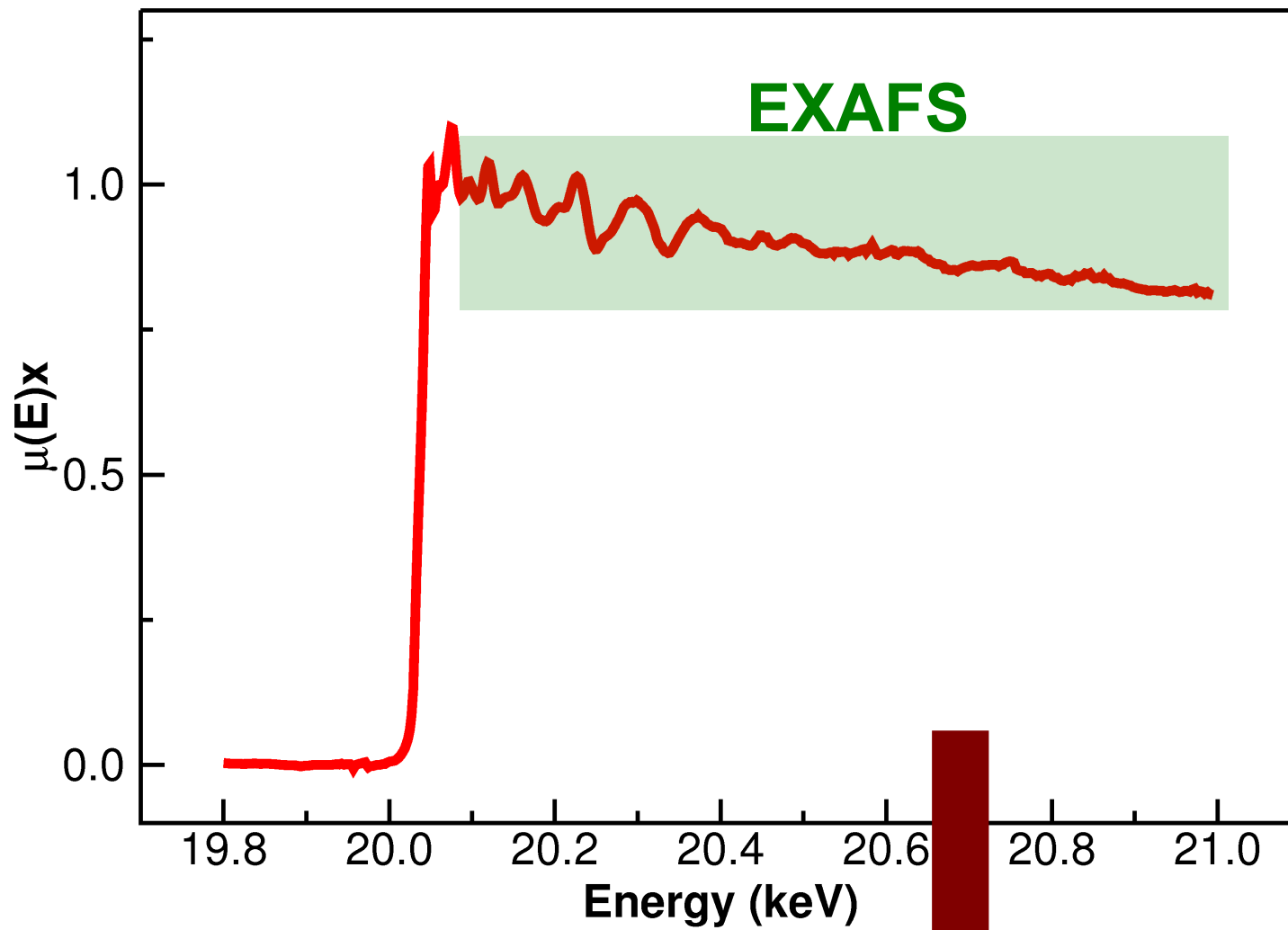
$\sim 1\text{ s}$



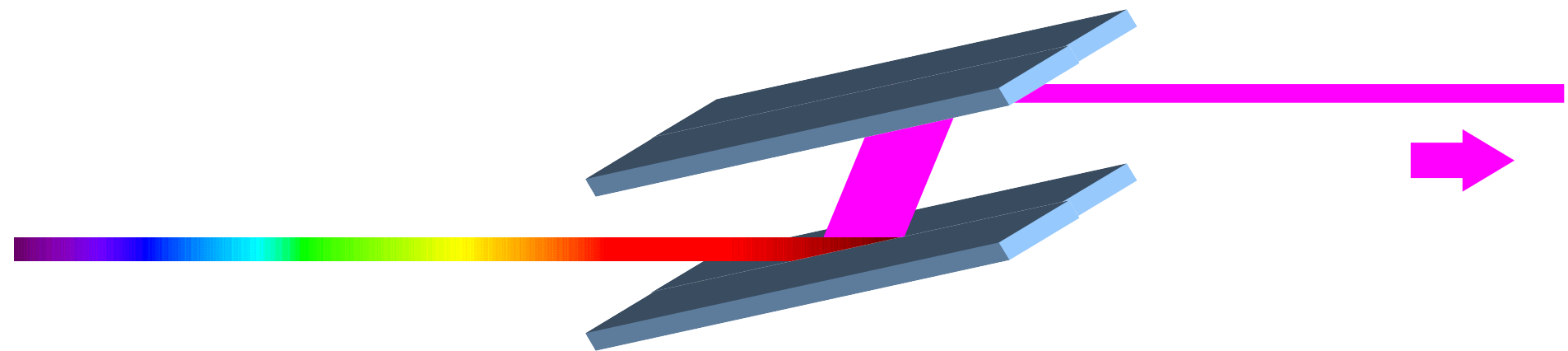
N_1



N_2



~ 1-20 min... :- (

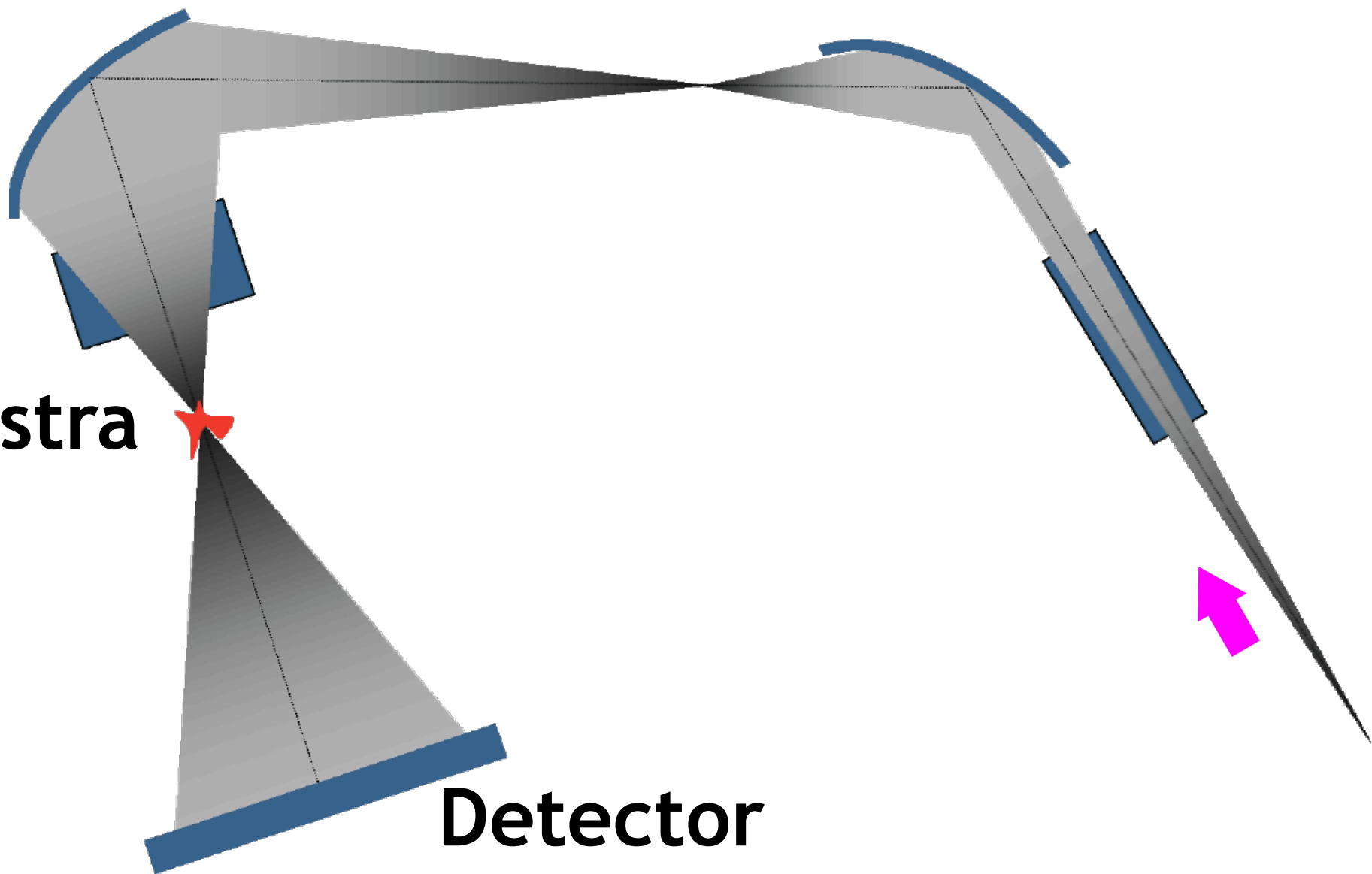


Todo el espectro al
mismo tiempo

Policromador

Muestra

Detector



Tiempo de
exposición

min 50 ms



Tiempo de
repetición

min 200 ms



Cada 200 ms...

EXAFS

+

DRIFTS

+

Espectrometría de masas

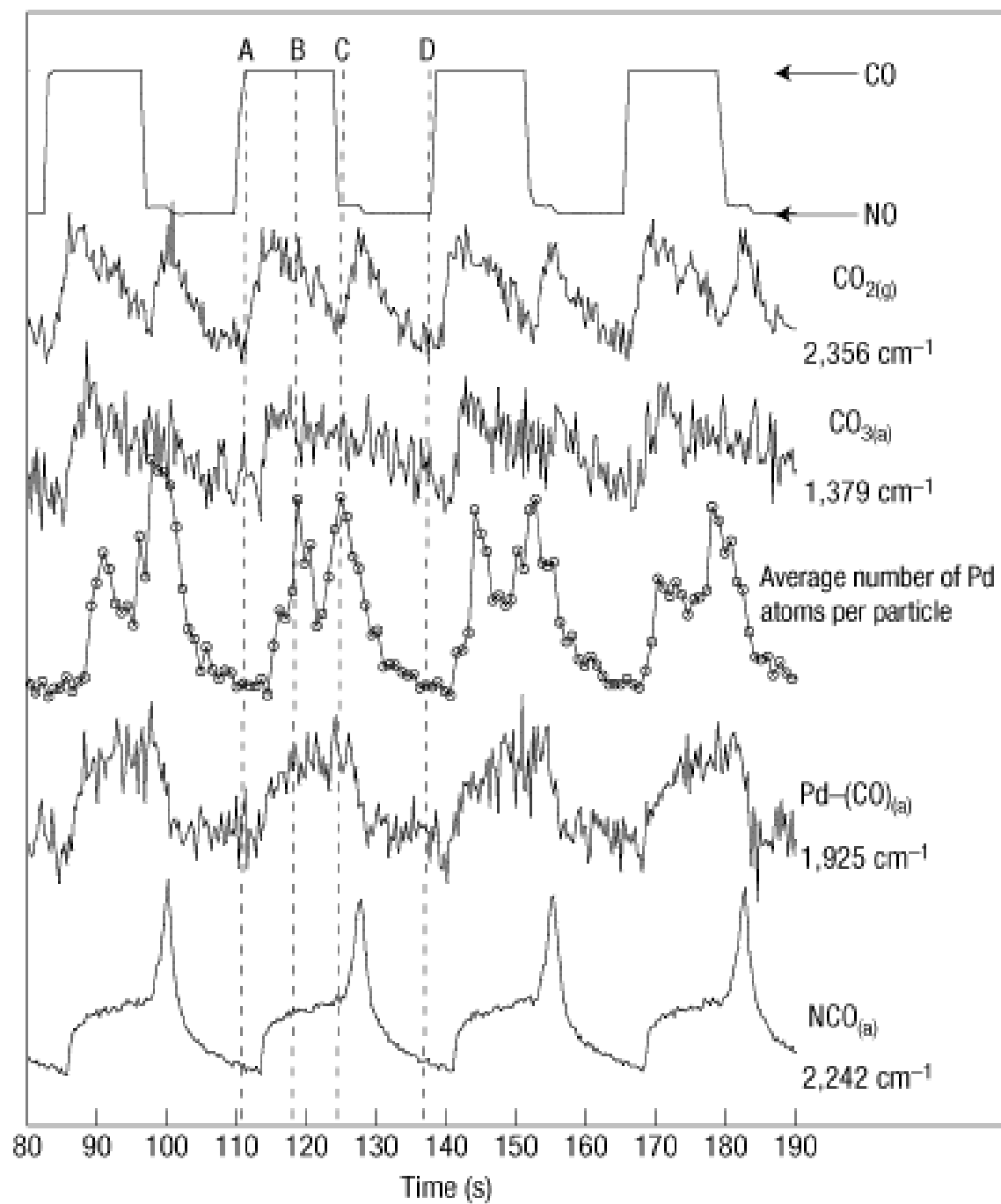
The diagram illustrates the layout of the LHCb detector. A particle's trajectory is shown as a curved line starting from the interaction point (marked with a red star) and moving towards the right. The trajectory is divided into two main regions: the **DRIFTS** region (left) and the **Detector** region (right). The **DRIFTS** region contains several blue rectangular elements representing drift chambers. The **Detector** region contains a large, curved blue structure representing the calorimeter. A pink arrow points to the trajectory in the **Detector** region. The text "stra" is partially visible on the left side of the diagram.

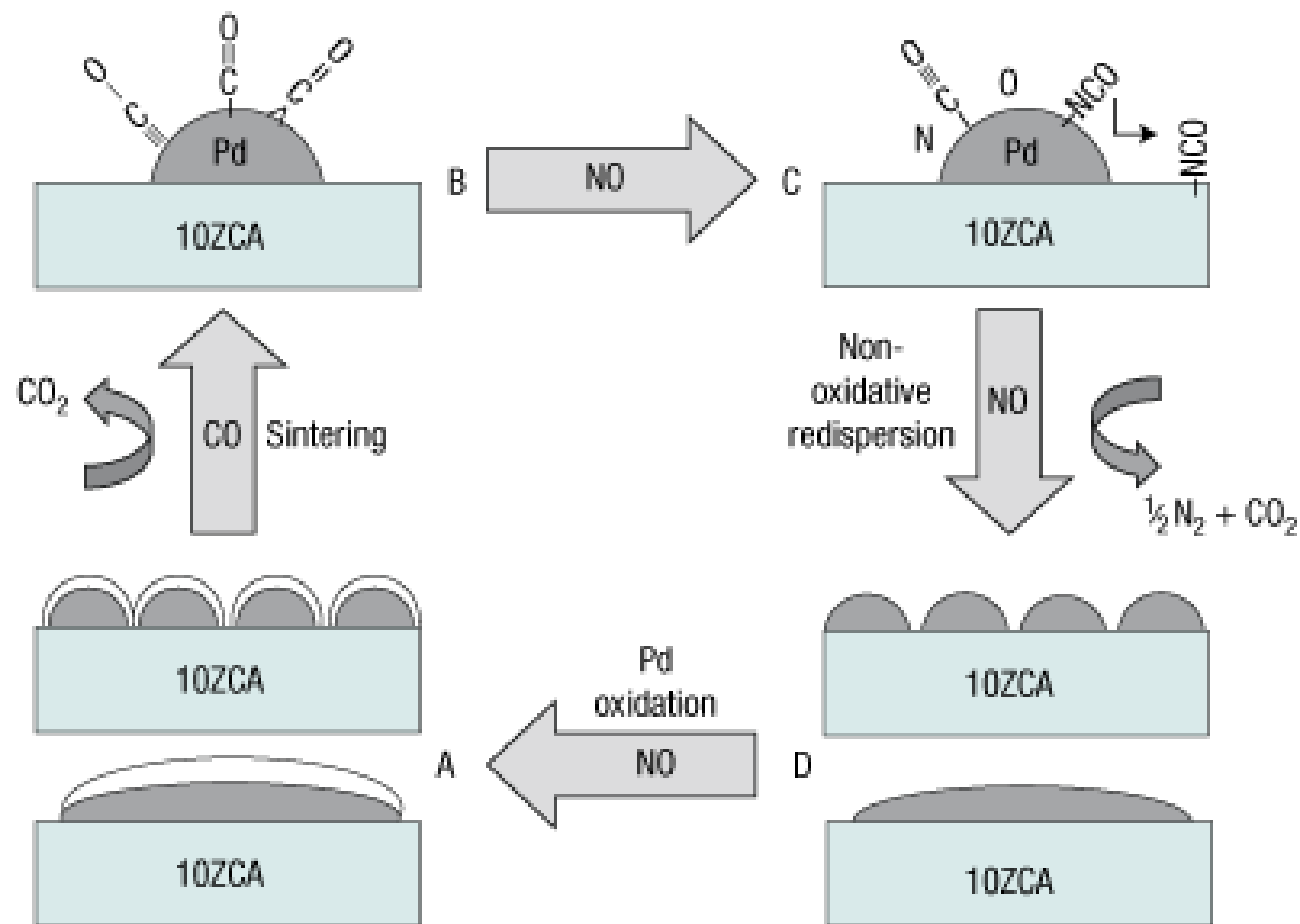
The diagram illustrates the LIGO detector layout and the path of a gravitational wave signal. A central point is labeled "Detector". A blue line, representing the signal path, starts at the "Detector", goes up and to the right, then curves around to the left, and finally goes down and to the left, ending at a point labeled "Drifts". A red arrow points from the "Drifts" back to the "Detector". A green arrow points from the "Detector" towards the "Drifts". The text "LIGO" is written in large, bold, black letters at the top. The text "Esp. Masas" is written in bold, black letters in the middle. The text "stra" is written in bold, black letters on the left. The text "Detector" is written in bold, black letters at the bottom. The text "DRIFTS" is written in bold, black letters at the top right.

The diagram illustrates the LIGO detector layout and the path of a gravitational wave signal. A central point is labeled "Detector". A blue line, representing the signal path, starts at the "Detector", goes up and to the right, then curves around to the left, and finally goes down and to the left, ending at a point labeled "Drifts". A red arrow points from the "Drifts" back to the "Detector". A green arrow points from the "Detector" towards the "Drifts". The text "LIGO" is written in large, bold, black letters at the top. The text "Esp. Masas" is written in bold, black letters in the middle. The text "stra" is written in bold, black letters on the left. The text "Detector" is written in bold, black letters at the bottom. The text "DRIFTS" is written in bold, black letters at the top right.

The diagram illustrates the LIGO detector layout and the path of a gravitational wave signal. A central point is labeled "Detector". A blue line, representing the signal path, starts at the "Detector", goes up and to the right, then curves around to the left, and finally goes down and to the left, ending at a point labeled "Drifts". A red arrow points from the "Drifts" back to the "Detector". A green arrow points from the "Detector" towards the "Drifts". The text "LIGO" is written in large, bold, black letters at the top. The text "Esp. Masas" is written in bold, black letters in the middle. The text "stra" is written in bold, black letters on the left. The text "Detector" is written in bold, black letters at the bottom. The text "DRIFTS" is written in bold, black letters at the top right.

[illegible]



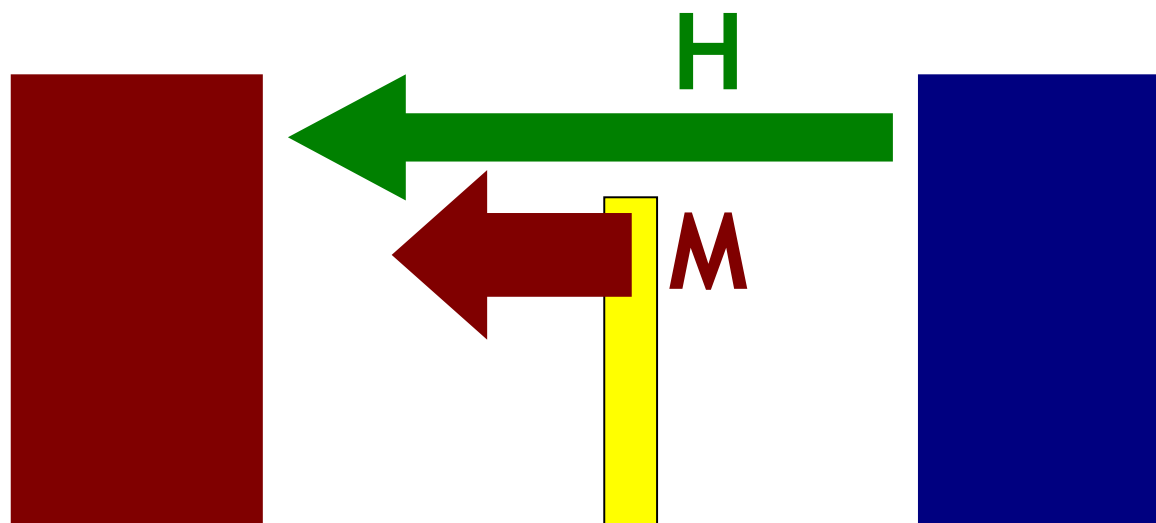


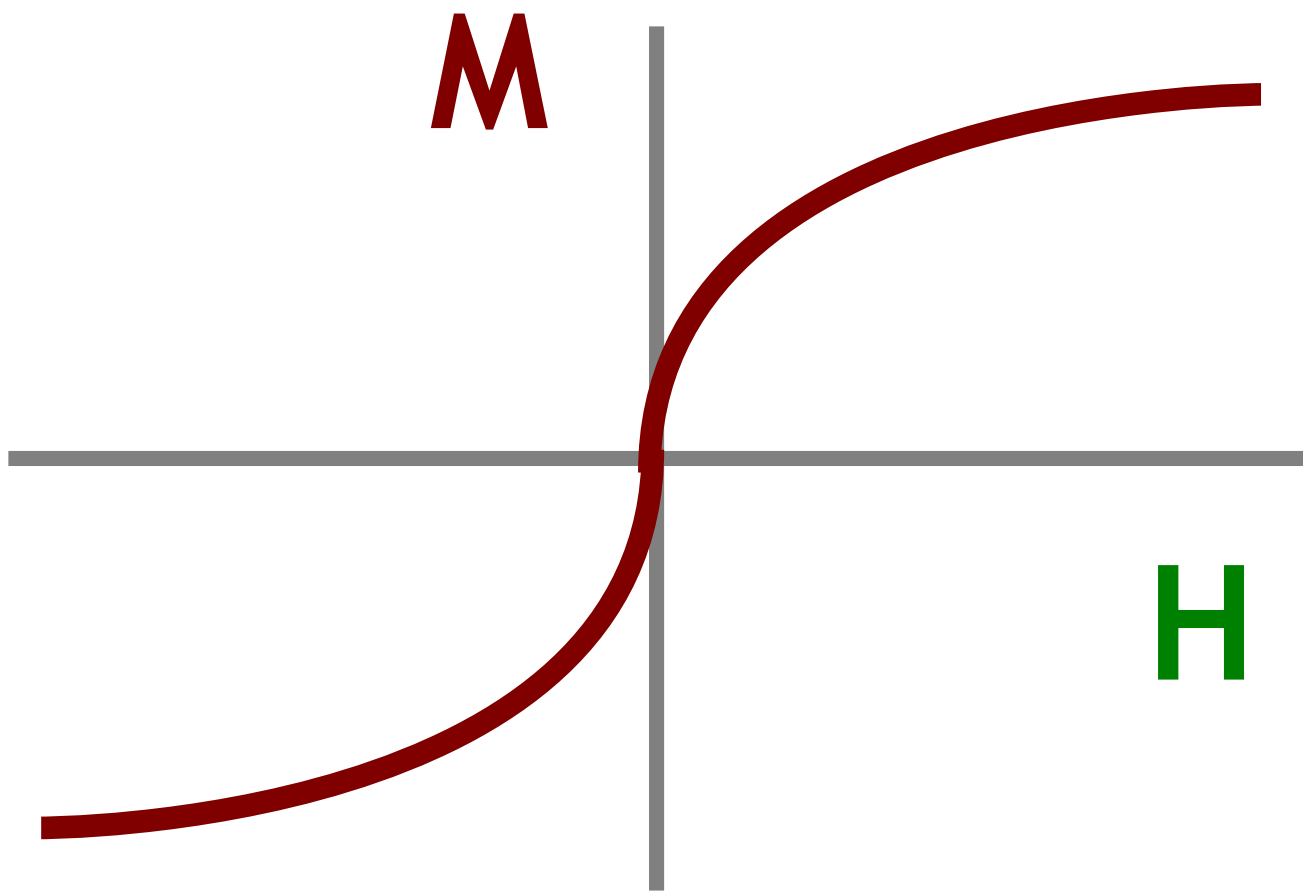
(2)

Dinámica de la **magnetización** de un material paramagnético

$H=0$

$M=0$





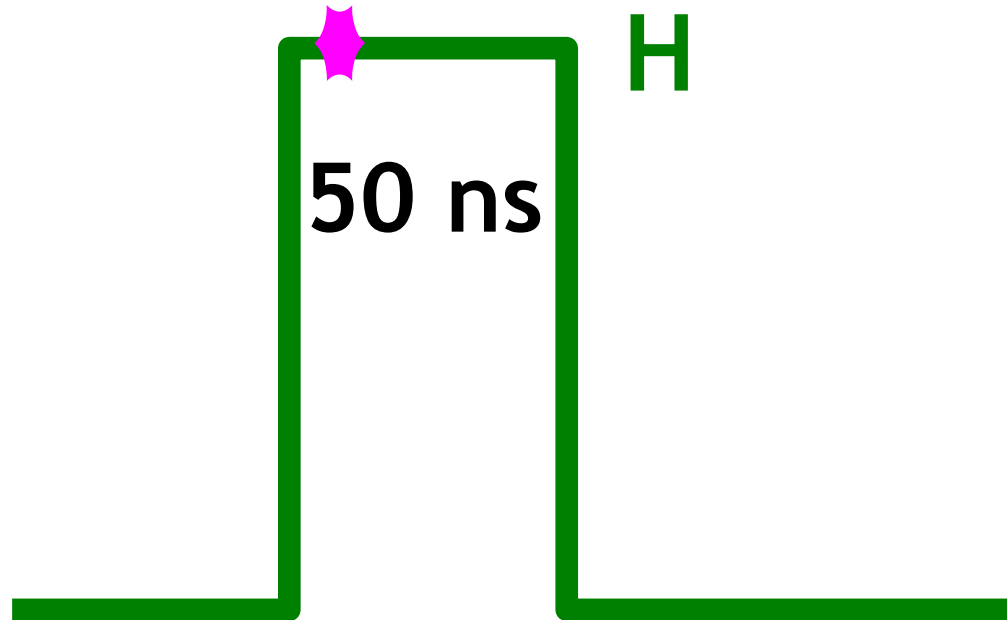
¿Instantánea o retardada?

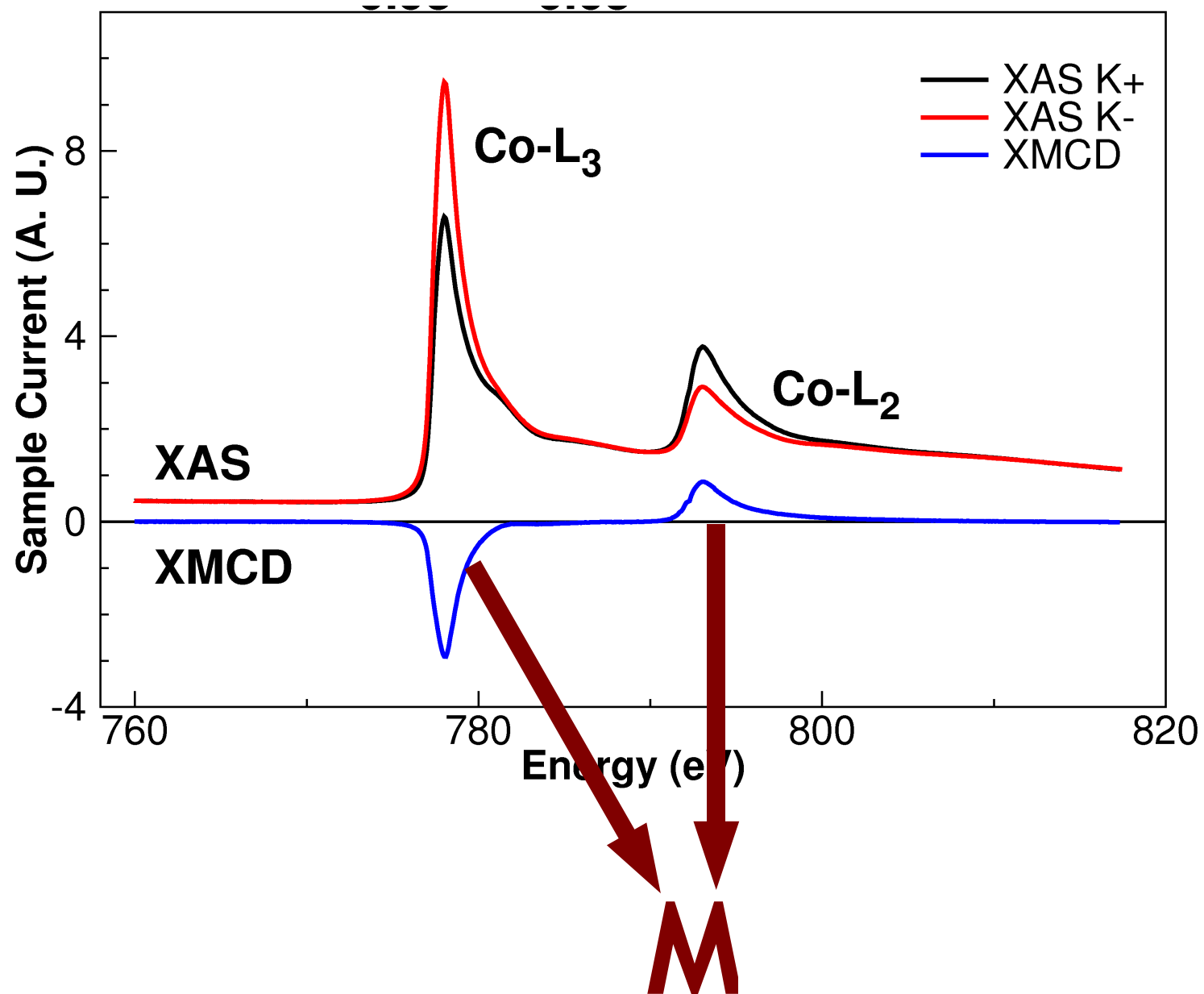
> 1 ns



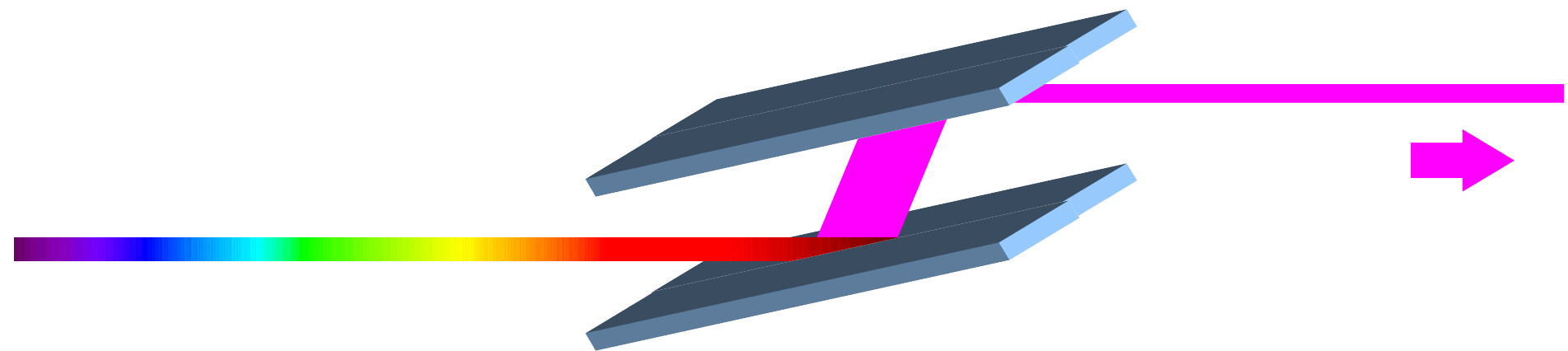
H

50 ns





~ 1-20 min... :- (

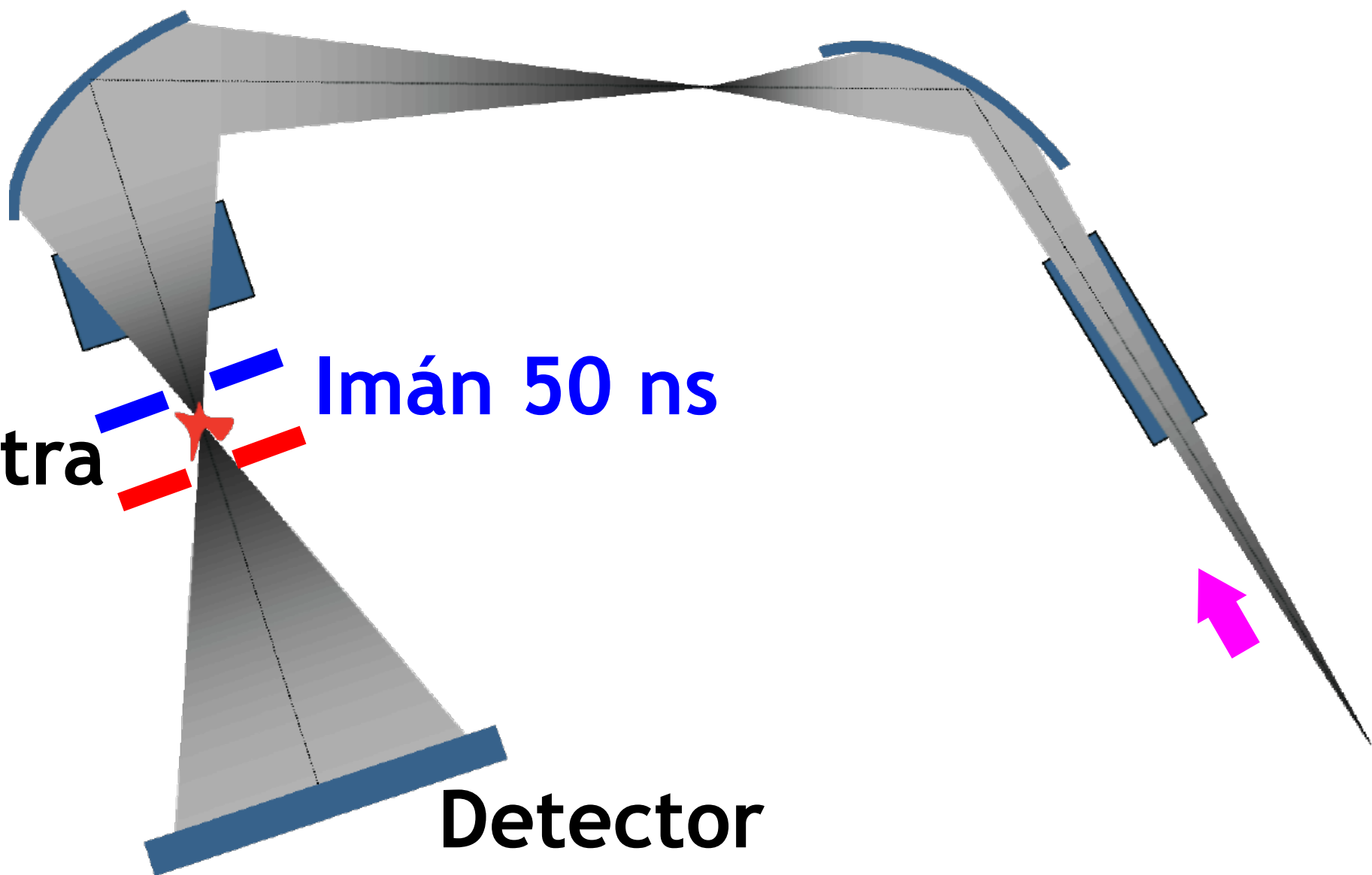


Policromador

Muestra

Imán 50 ns

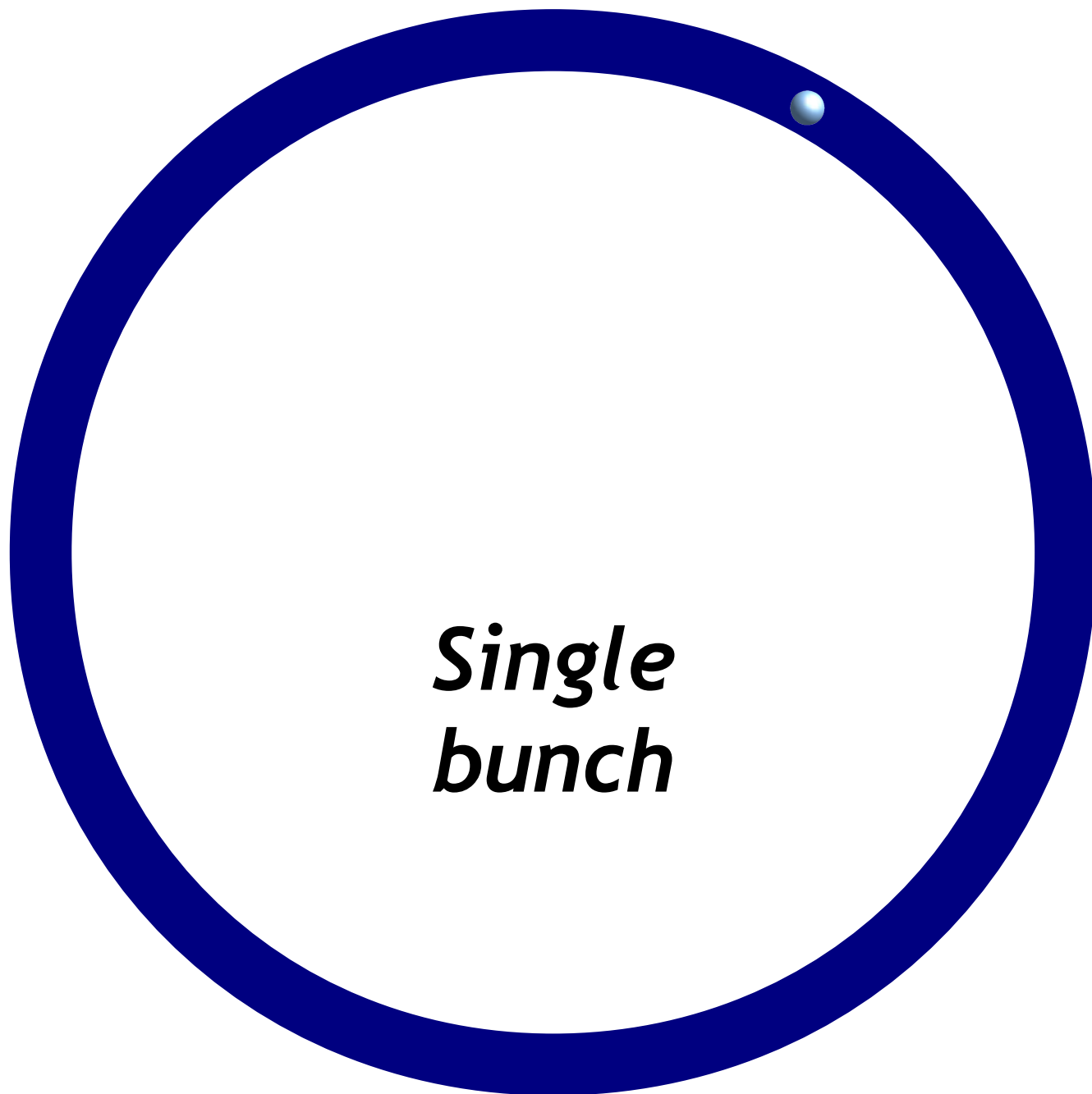
Detector



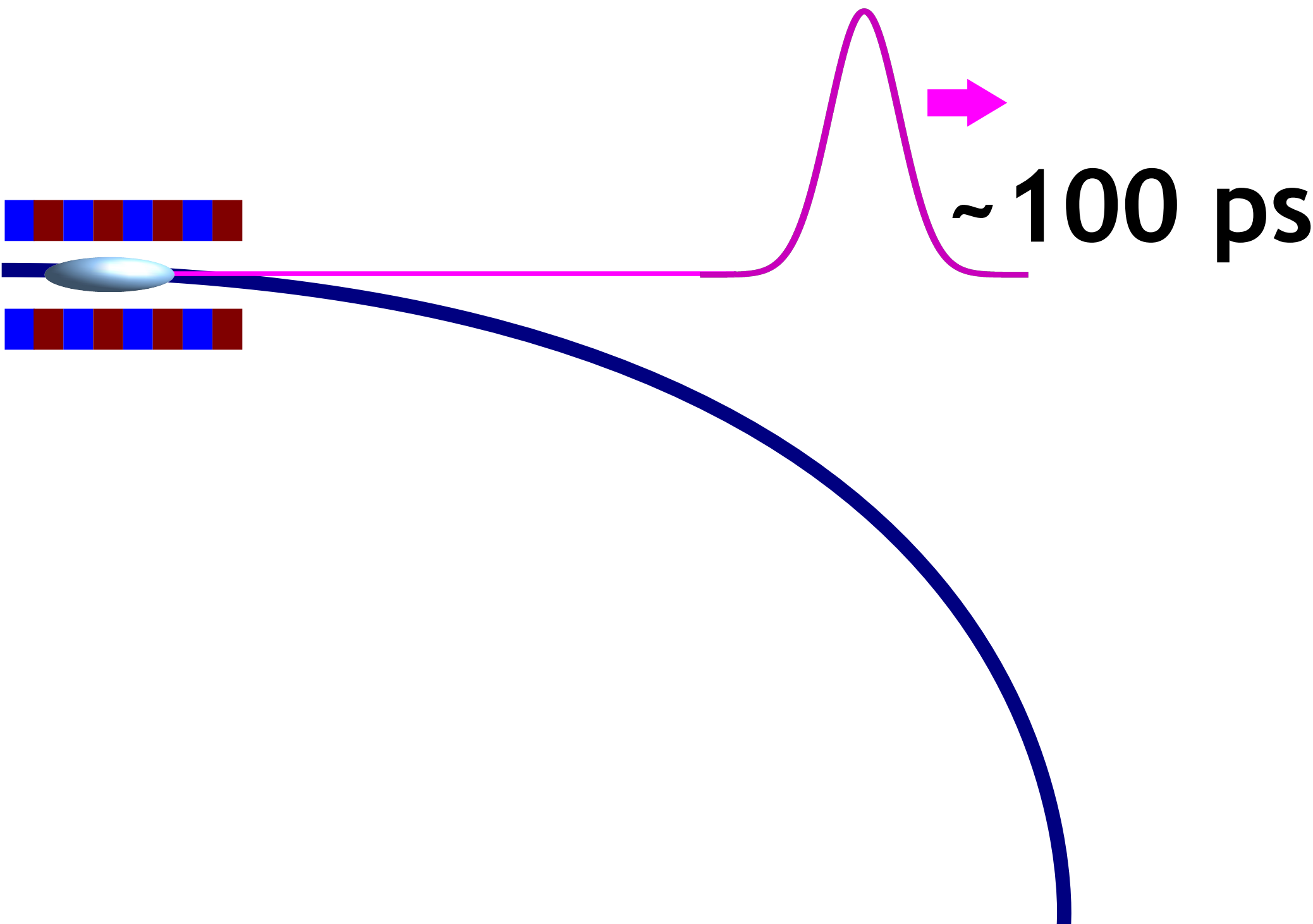
min 50 ms

:-)



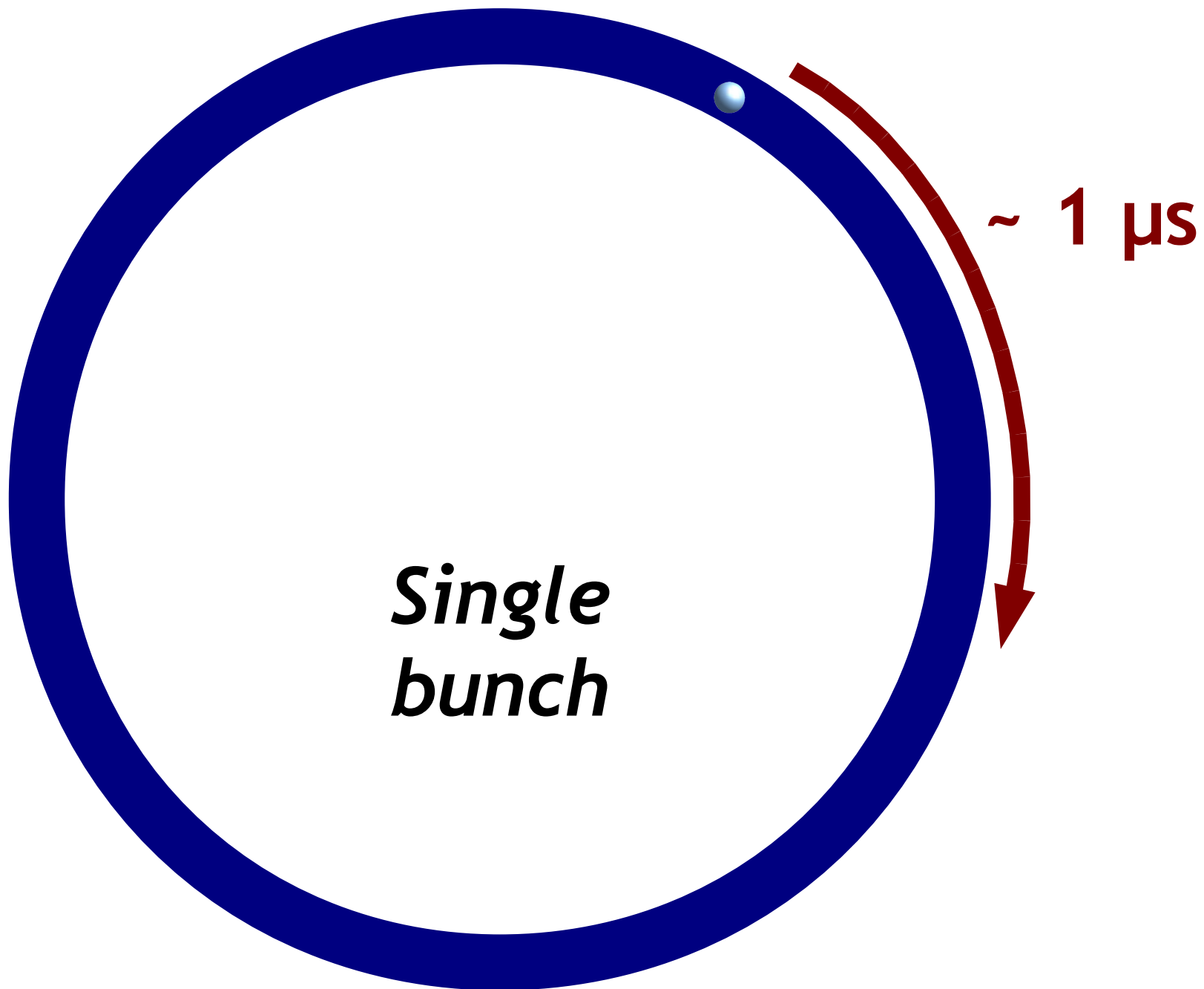


***Single
bunch***



Flujo de rayos X bajo

:- (



100 ps

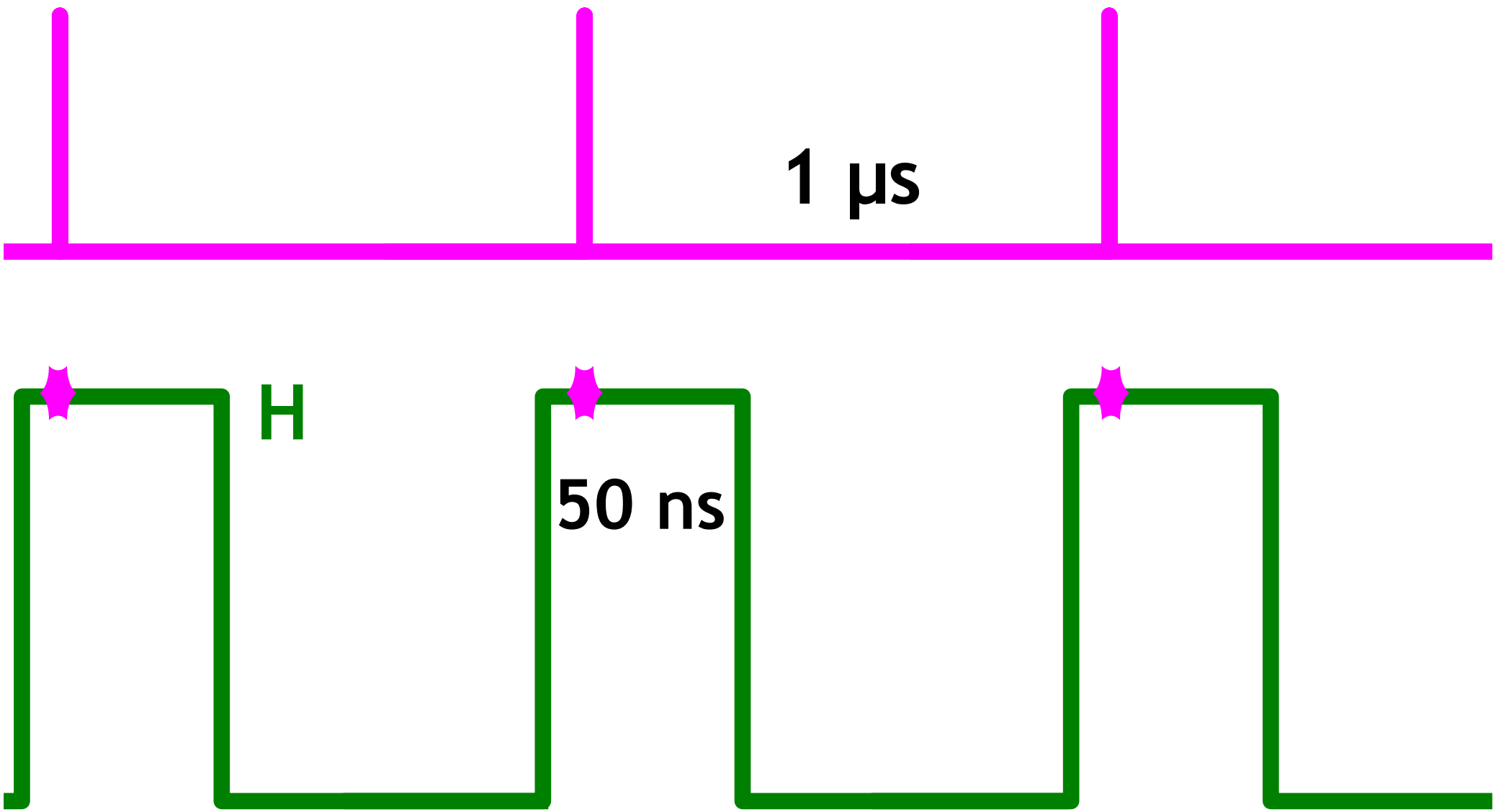
Probe

1 μ s

H

50 ns

Pump



100 ps

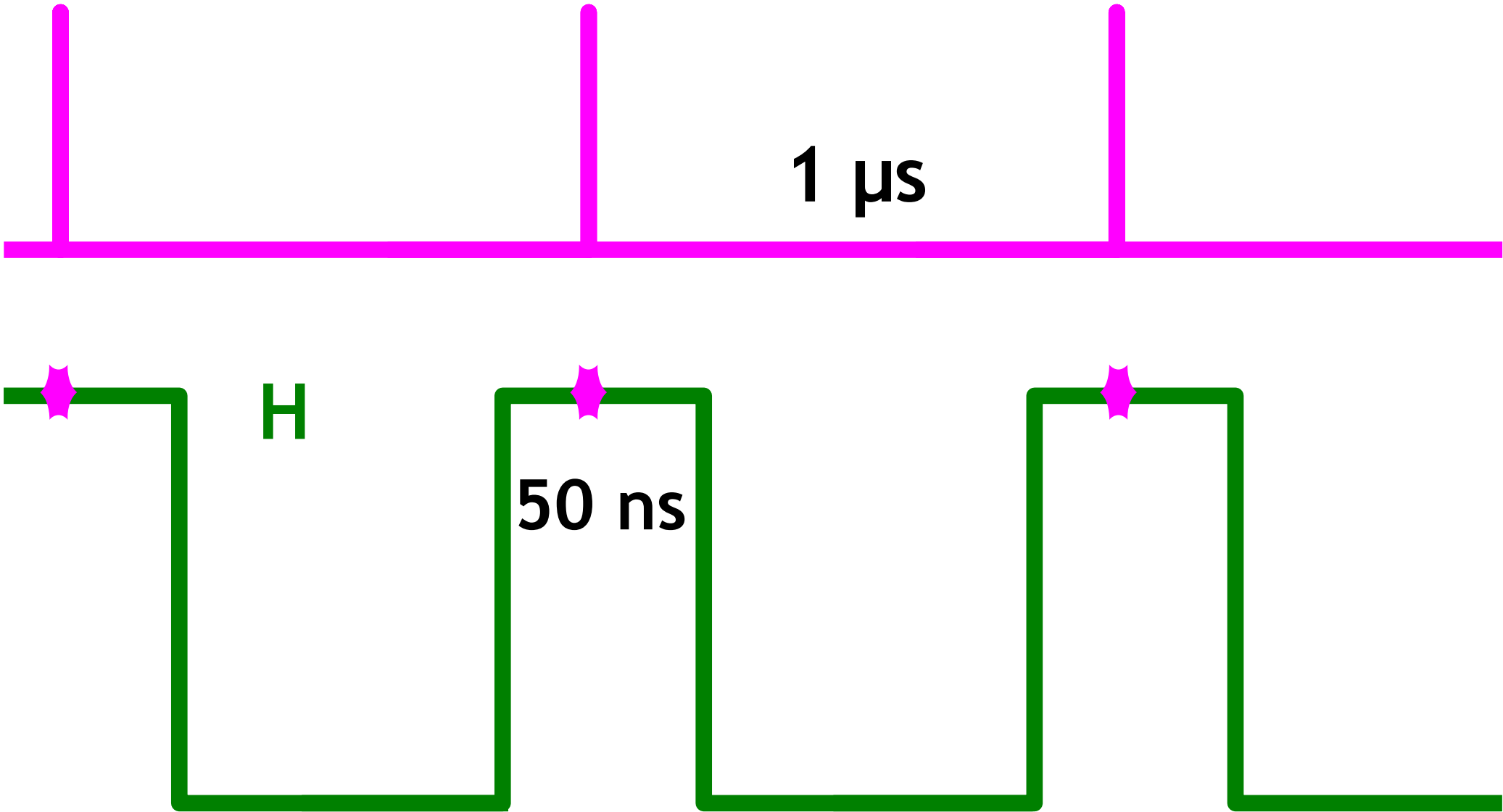
Probe

1 μ s

H

50 ns

Pump



100 ps

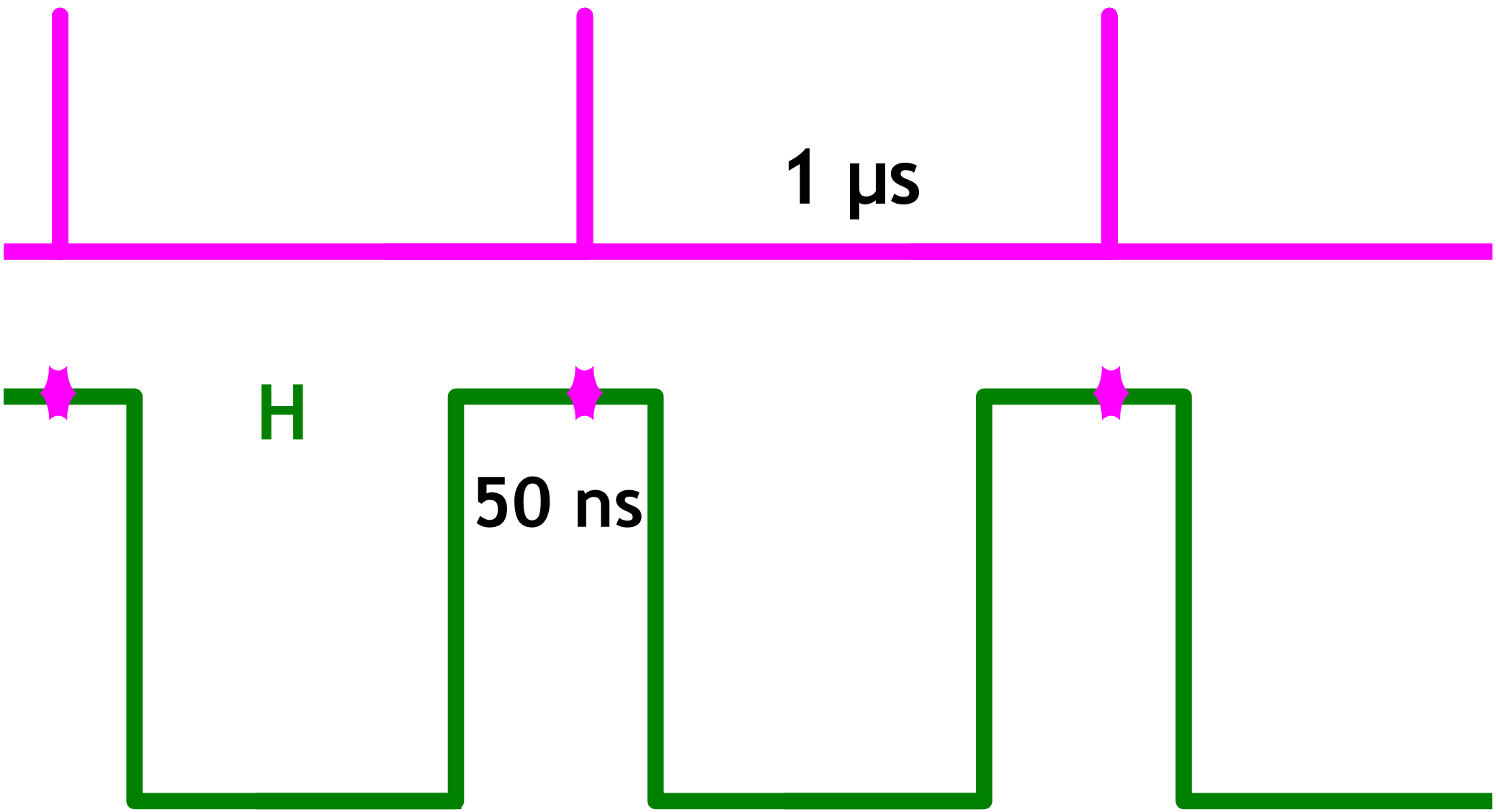
Probe

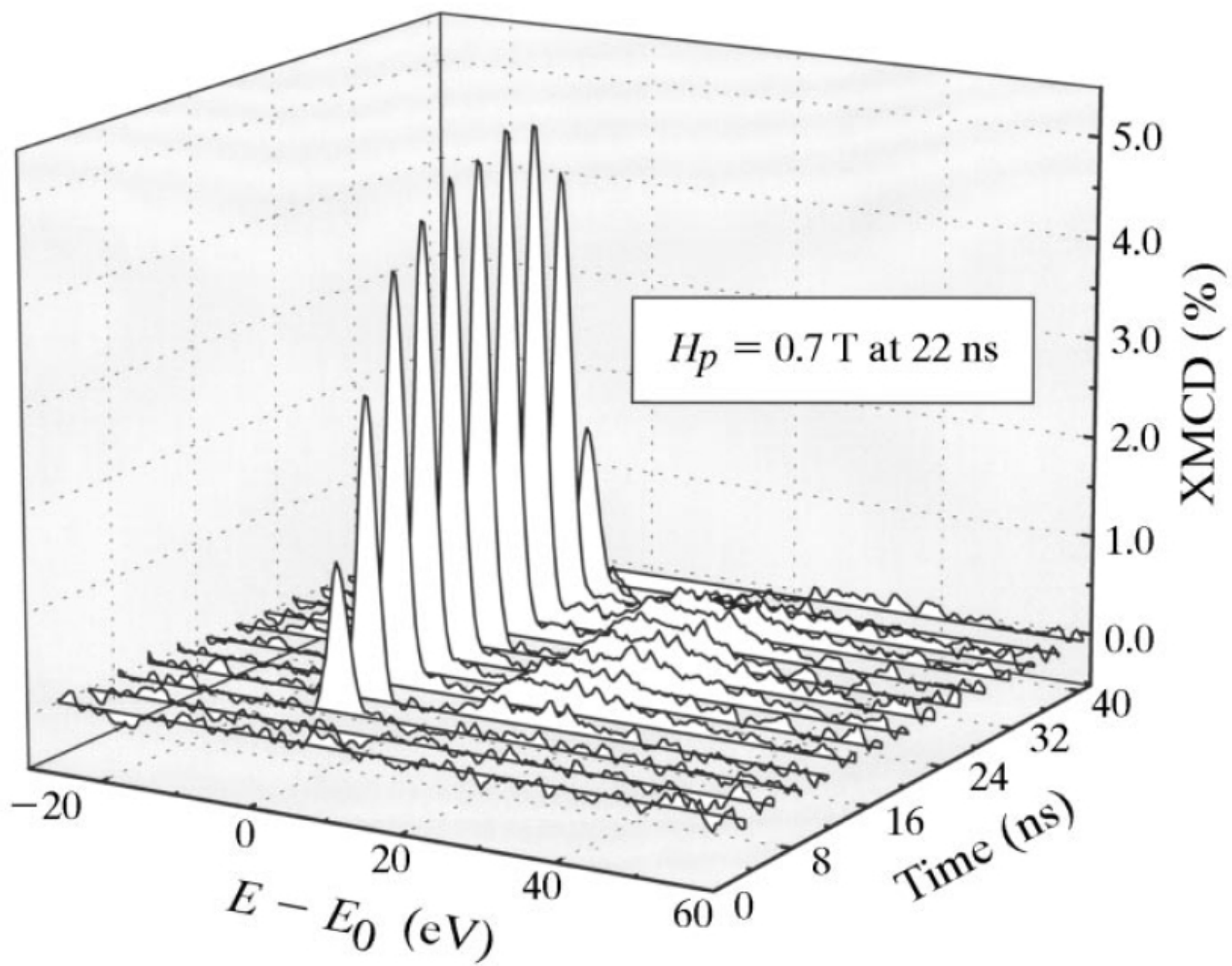
1 μ s

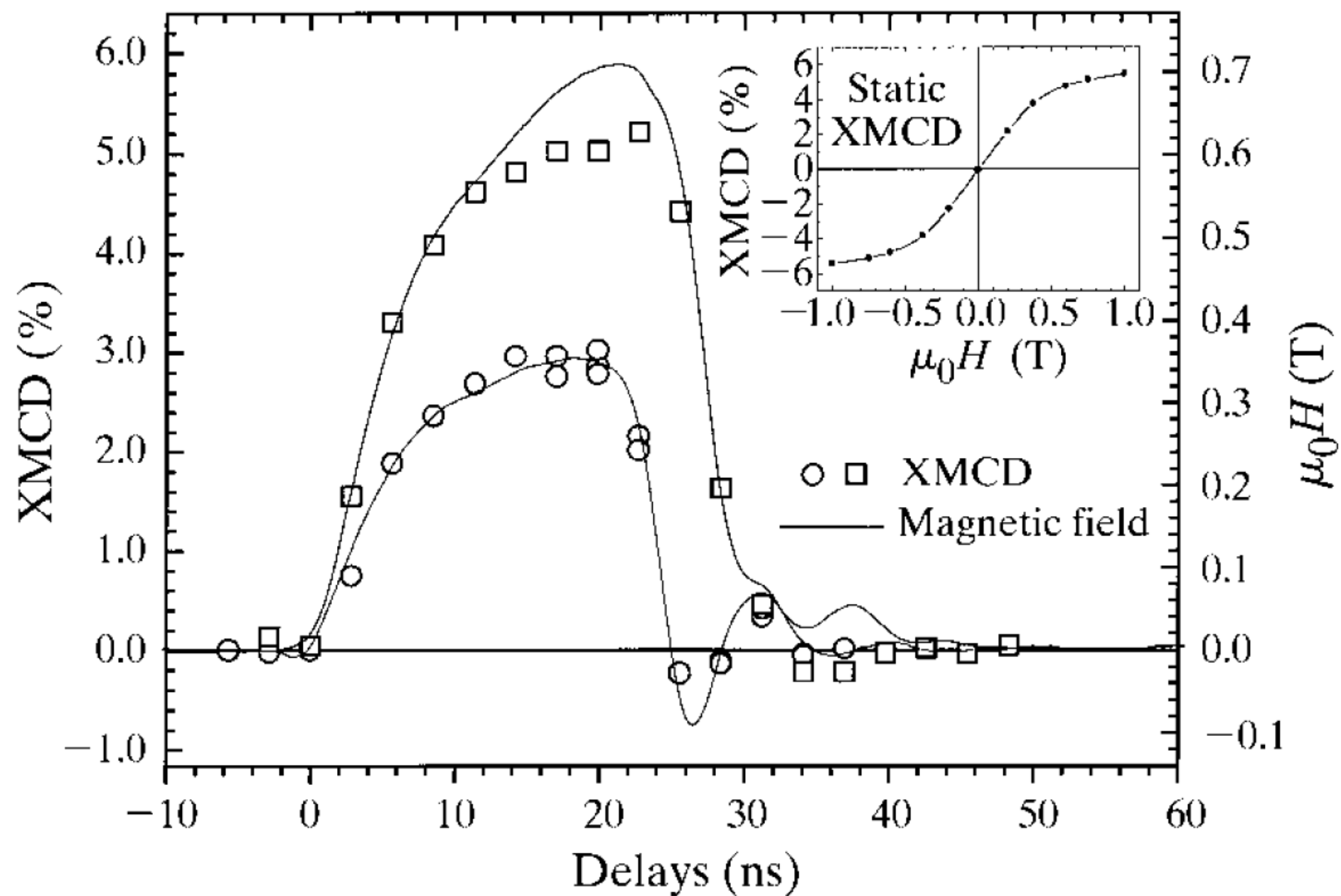
H

50 ns

Pump

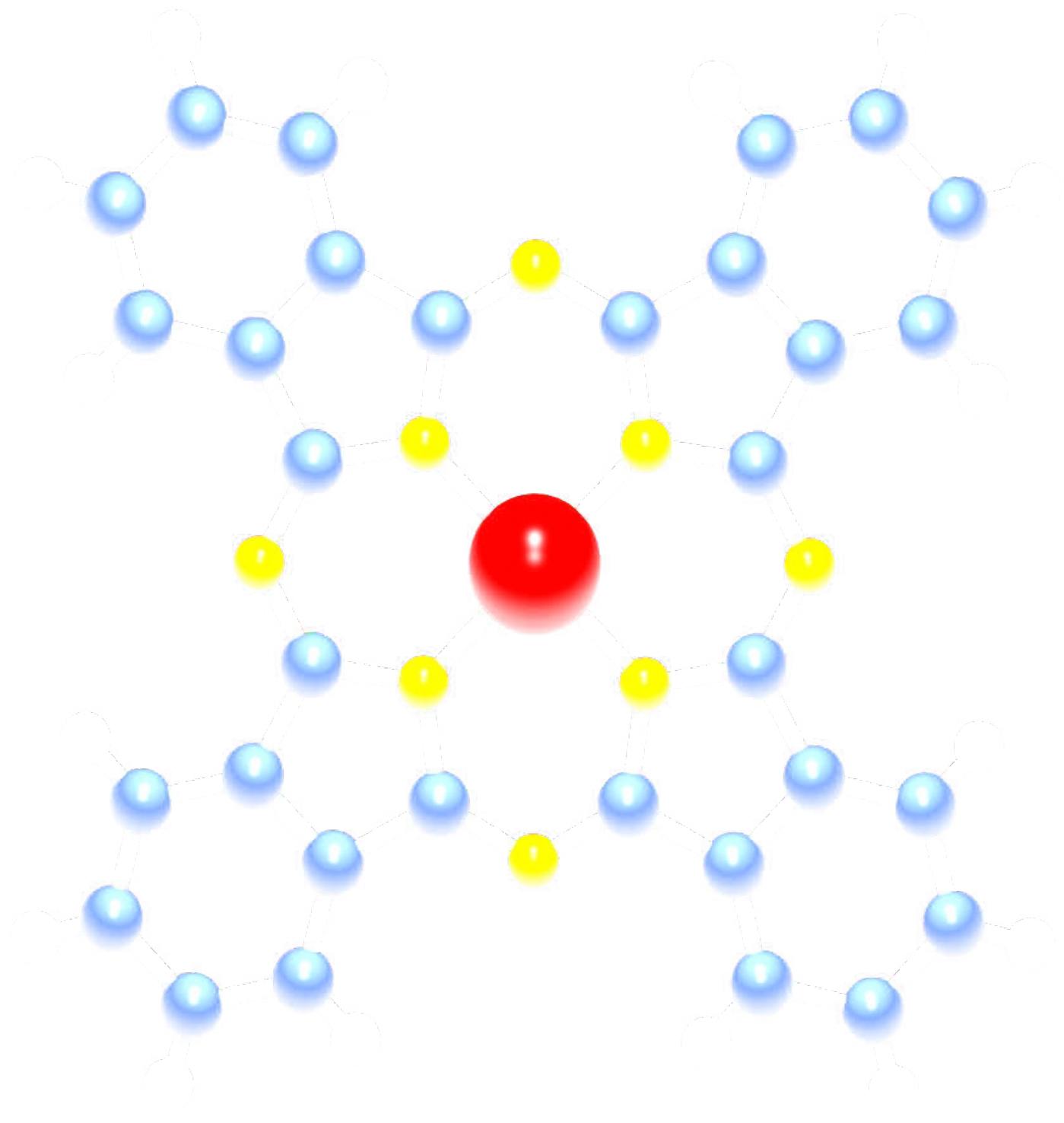


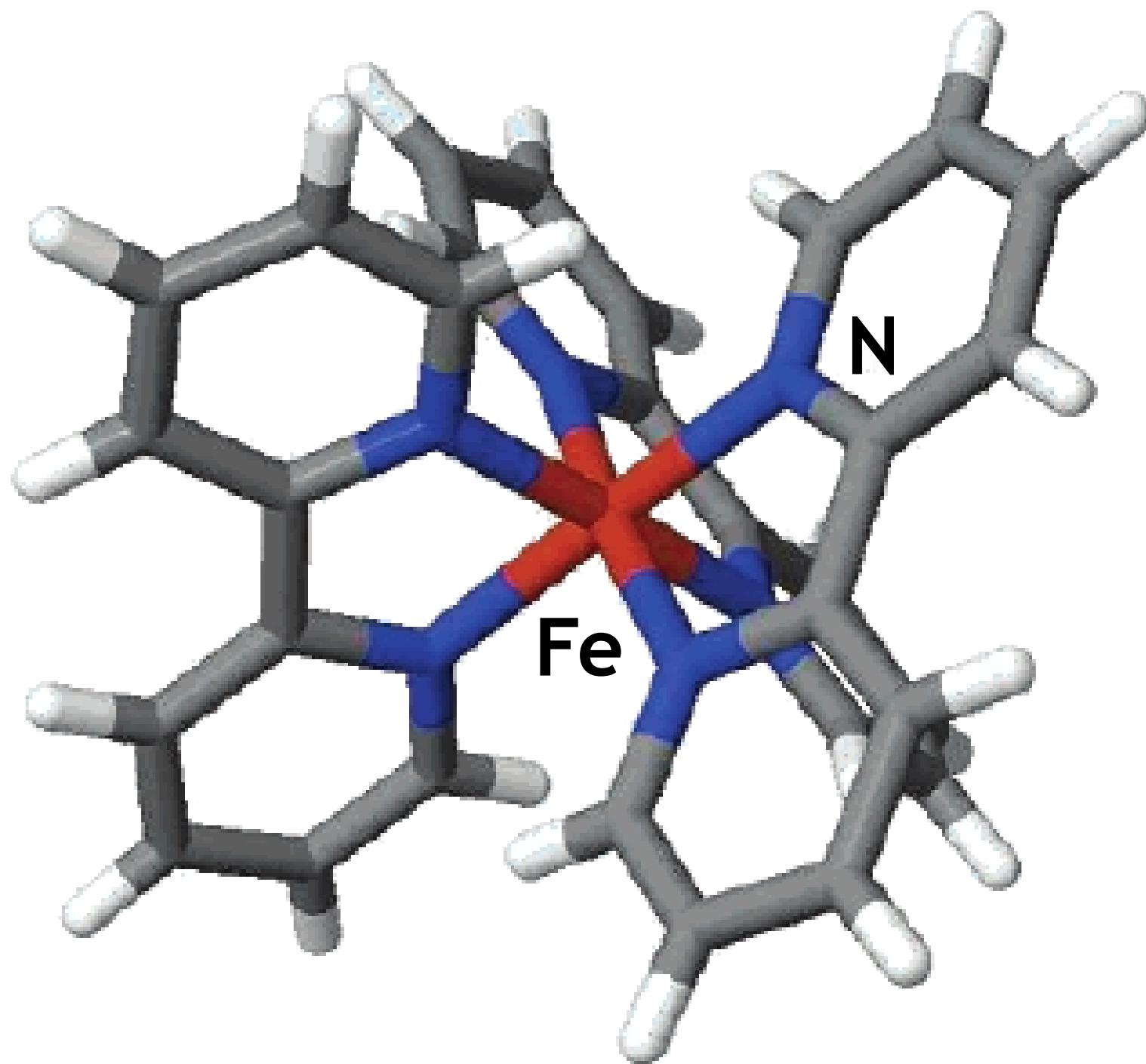




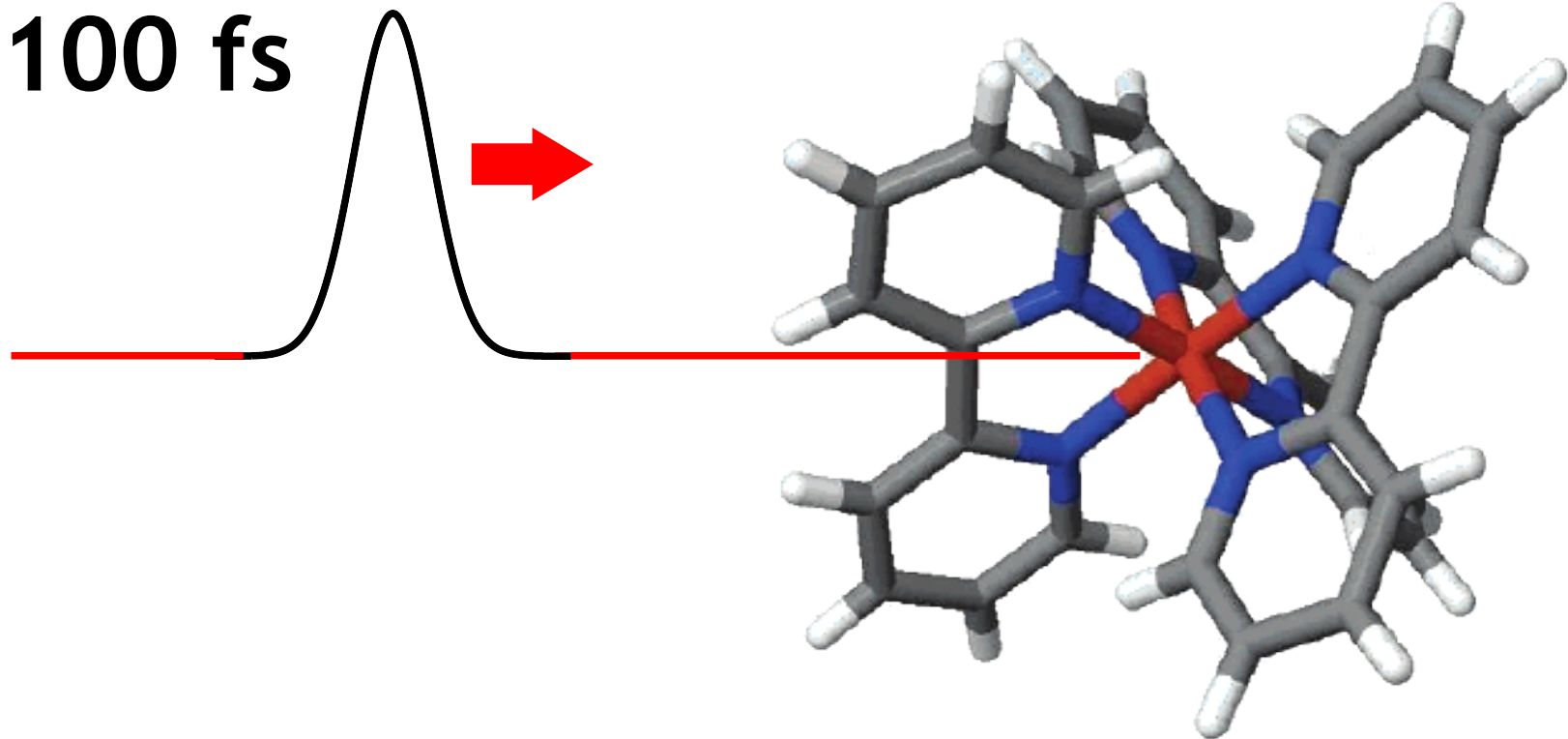
(3)

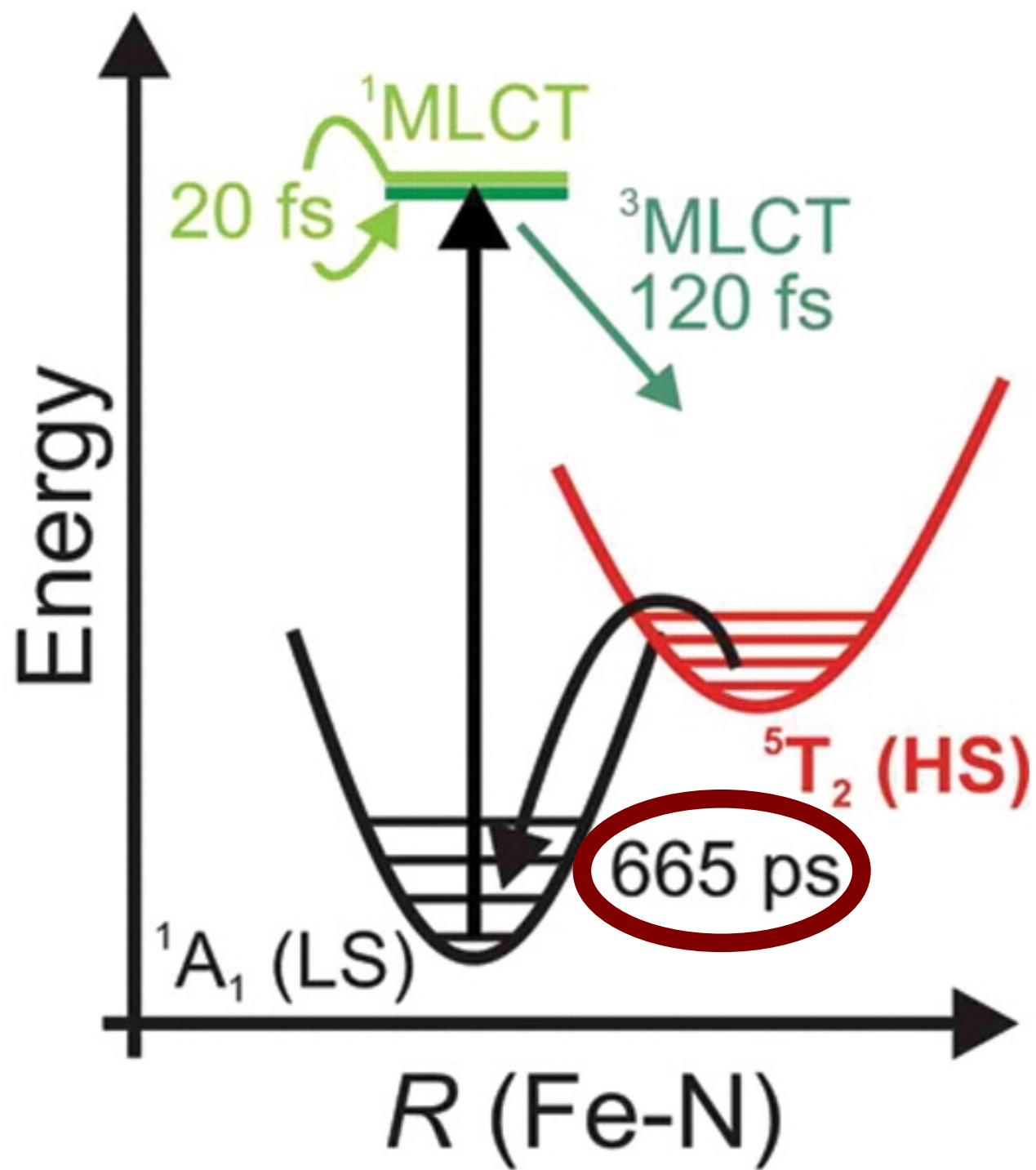
**Cambios ultrarrápidos
en las distancias de
coordinación de un
molécula organometálica**



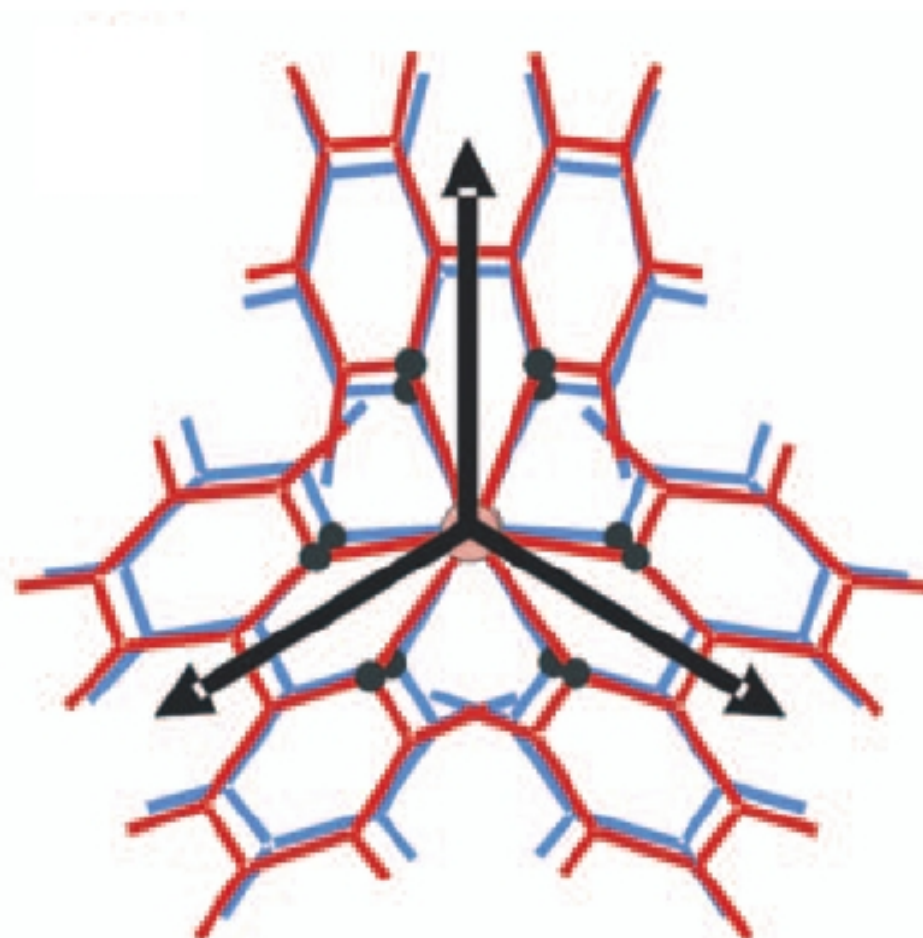
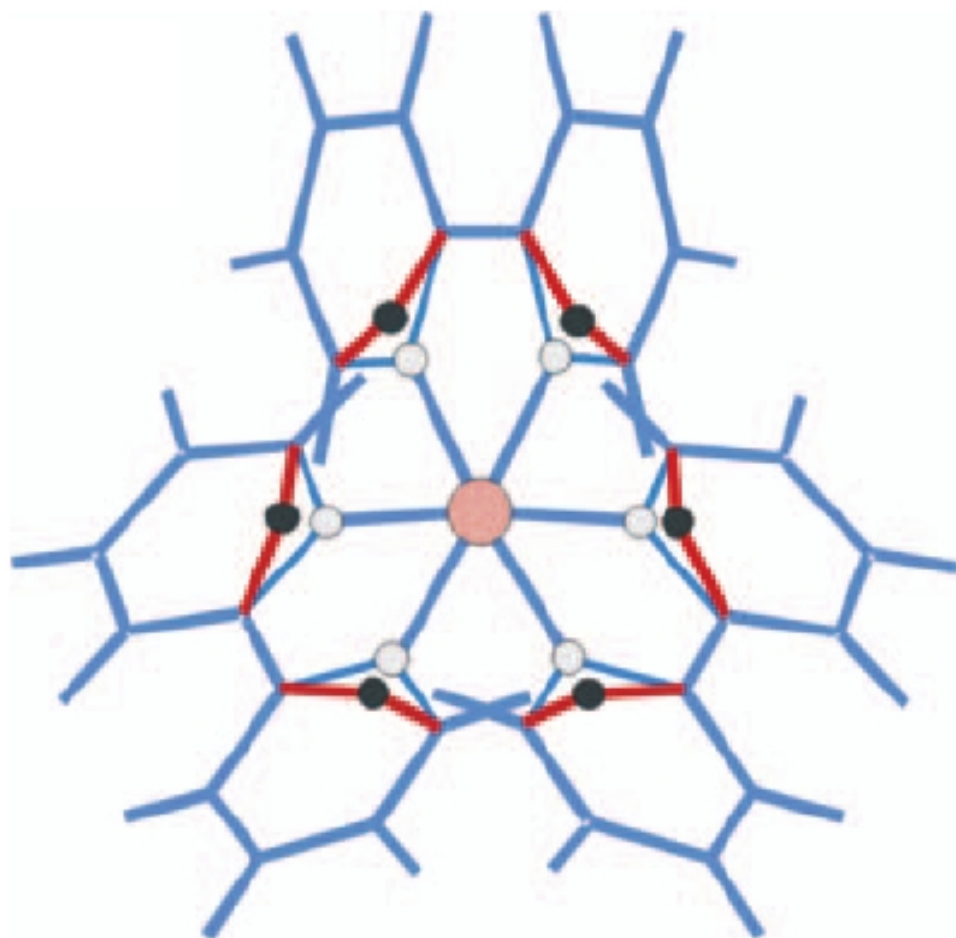


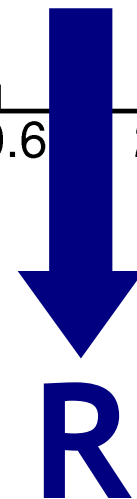
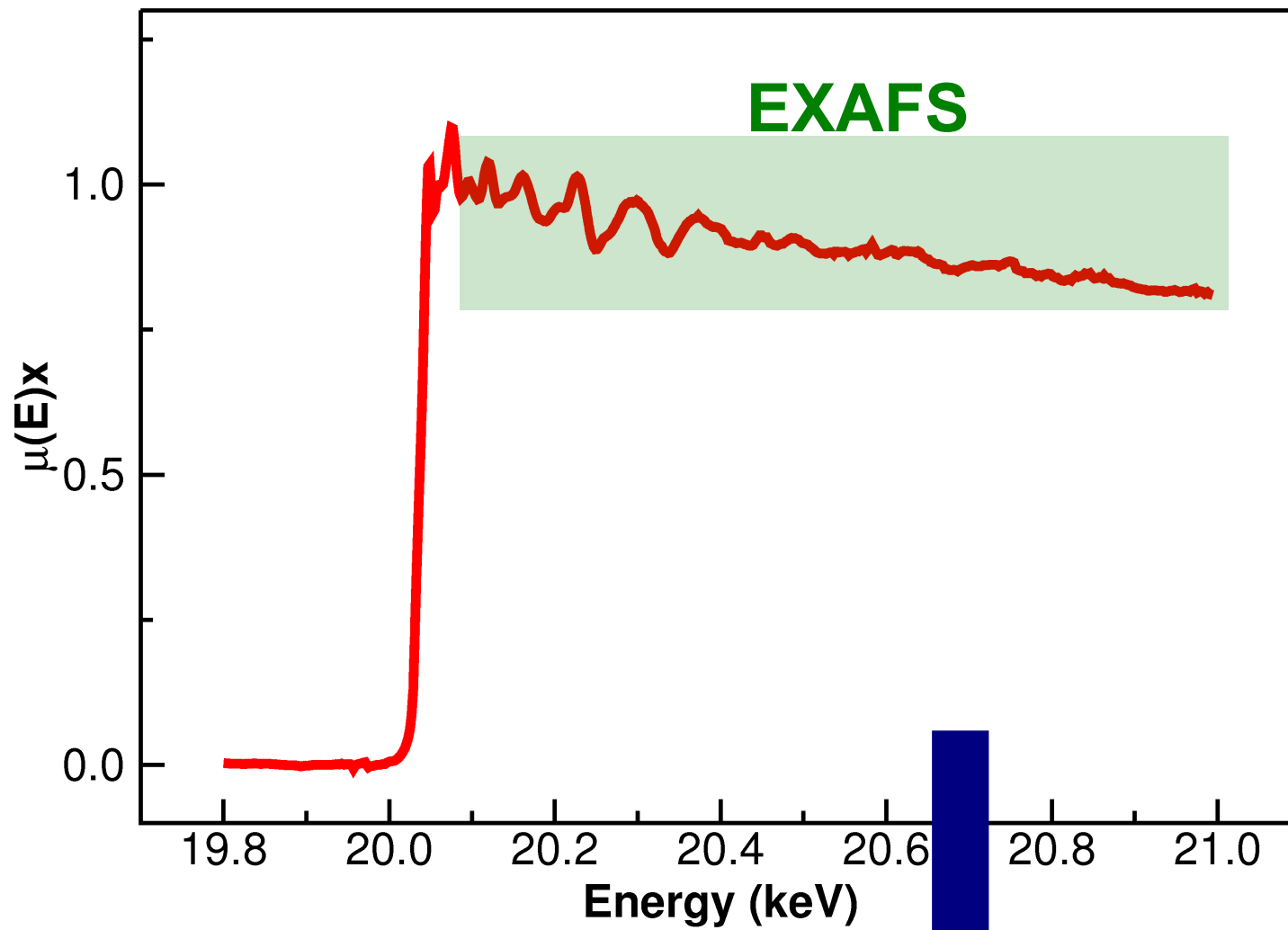
100 fs



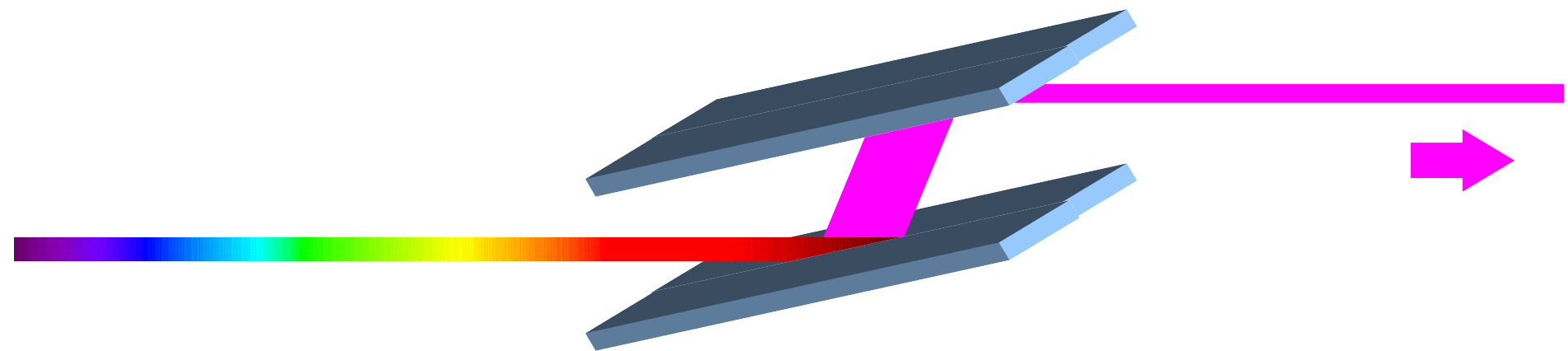


665 ps





~ 1-20 min... :- (

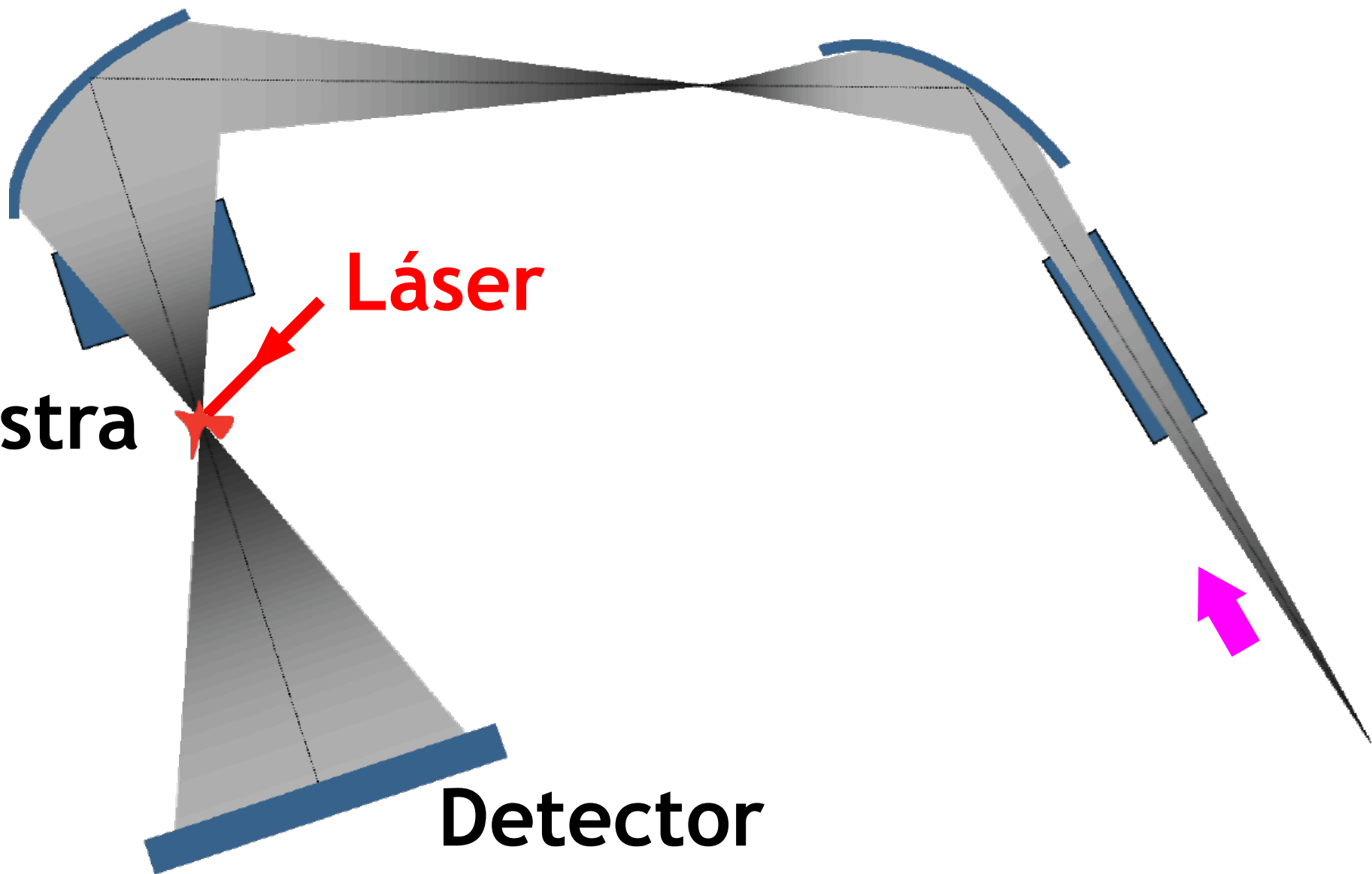


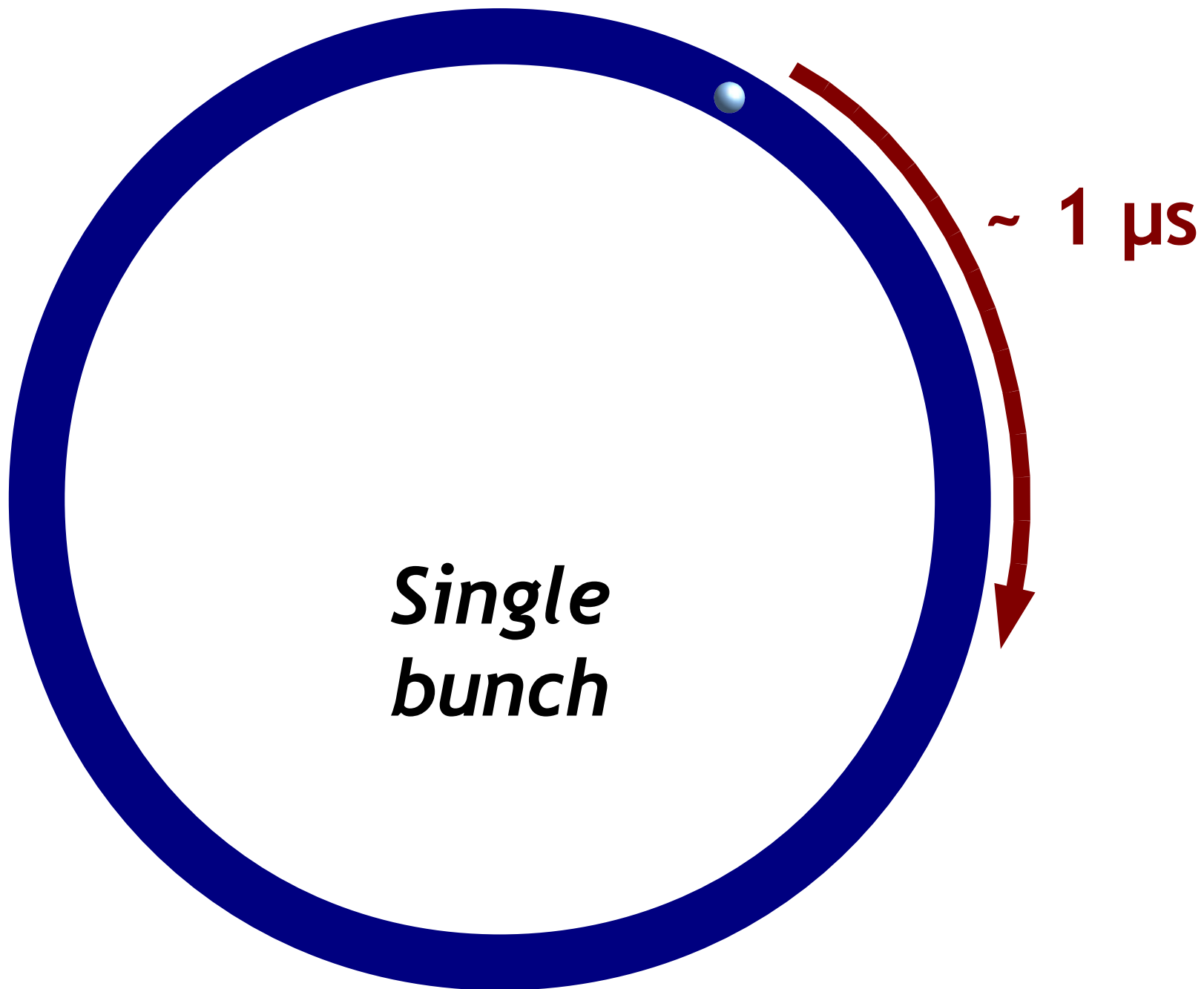
Policromador

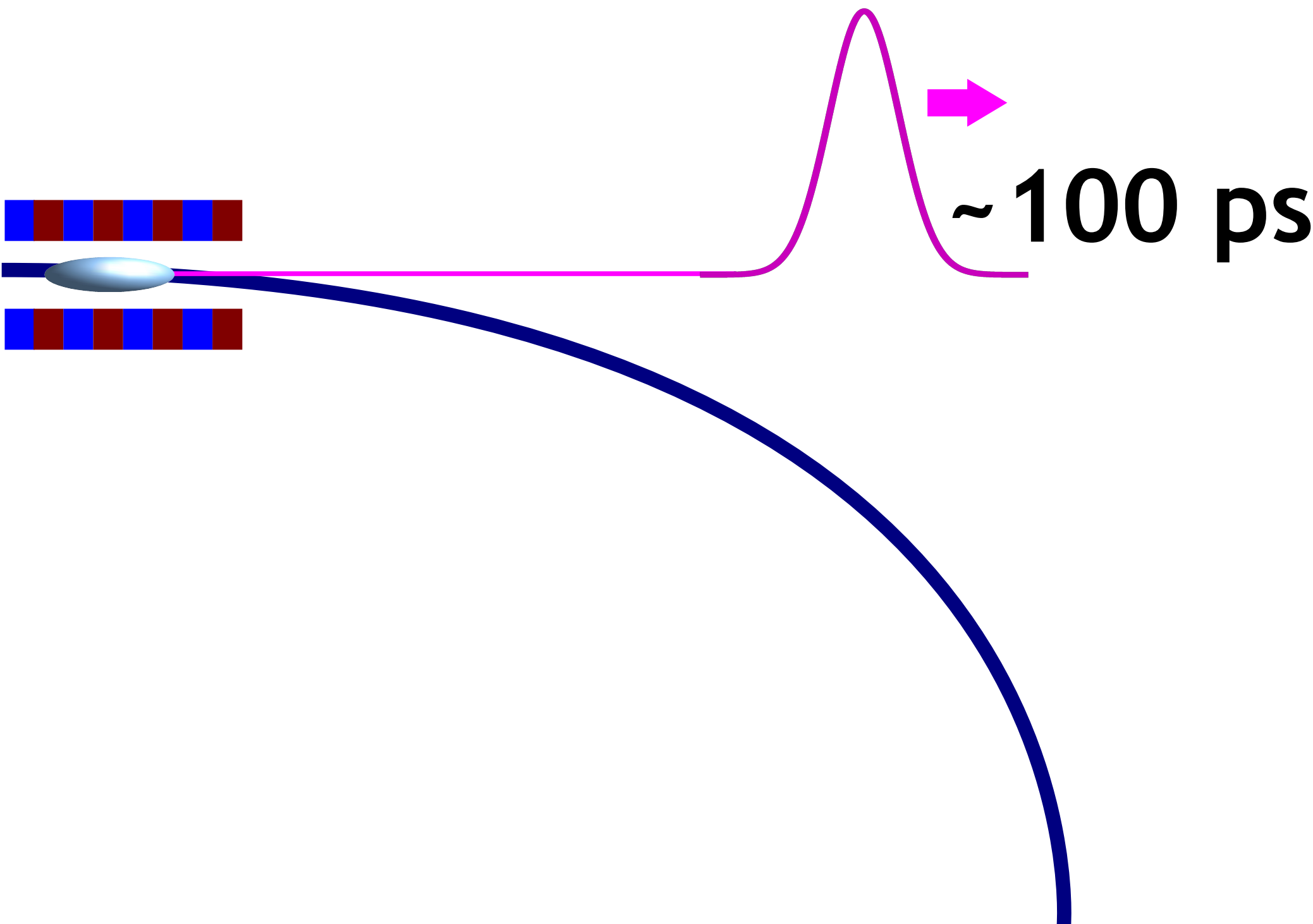
Muestra

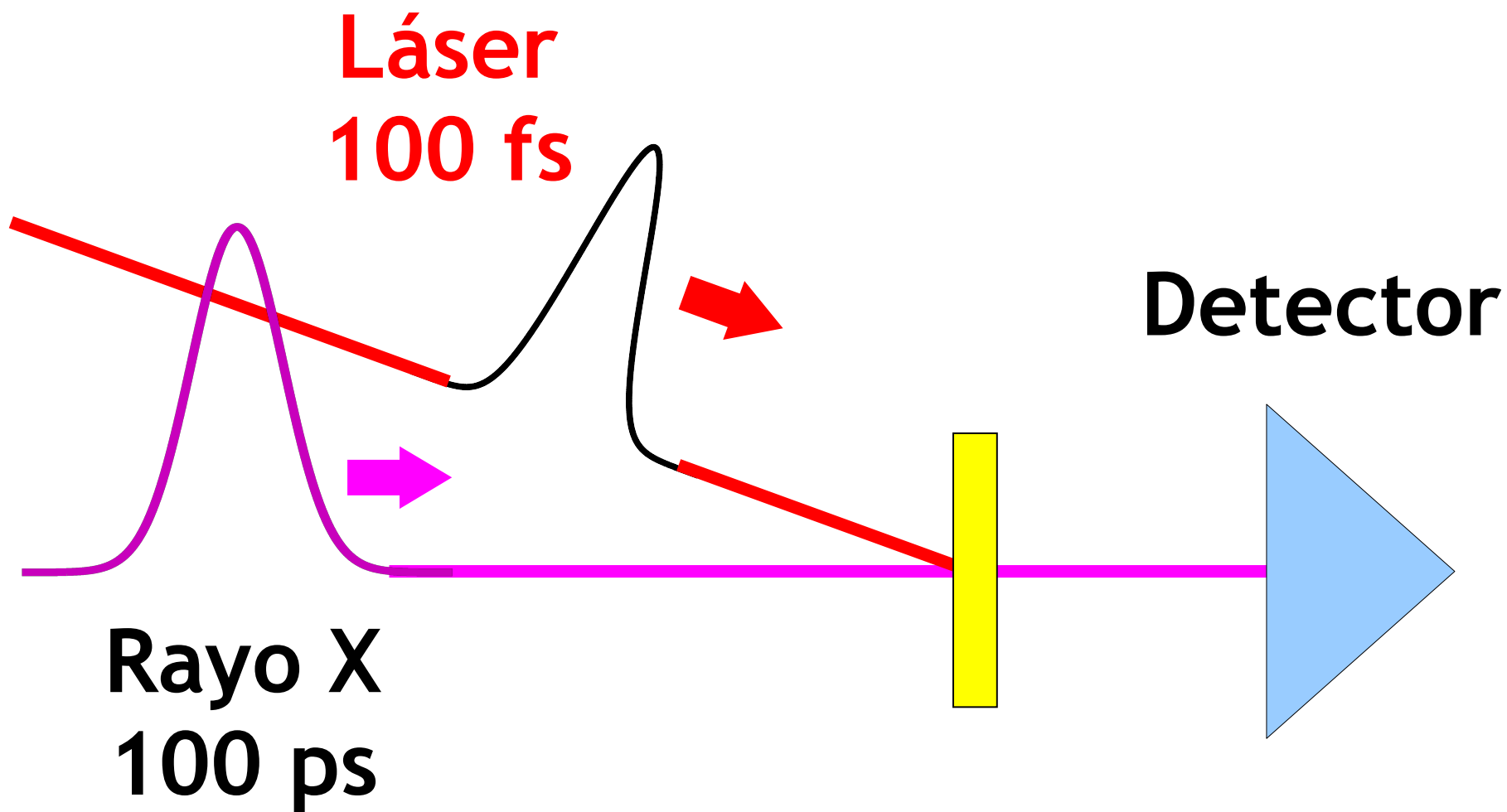
Láser

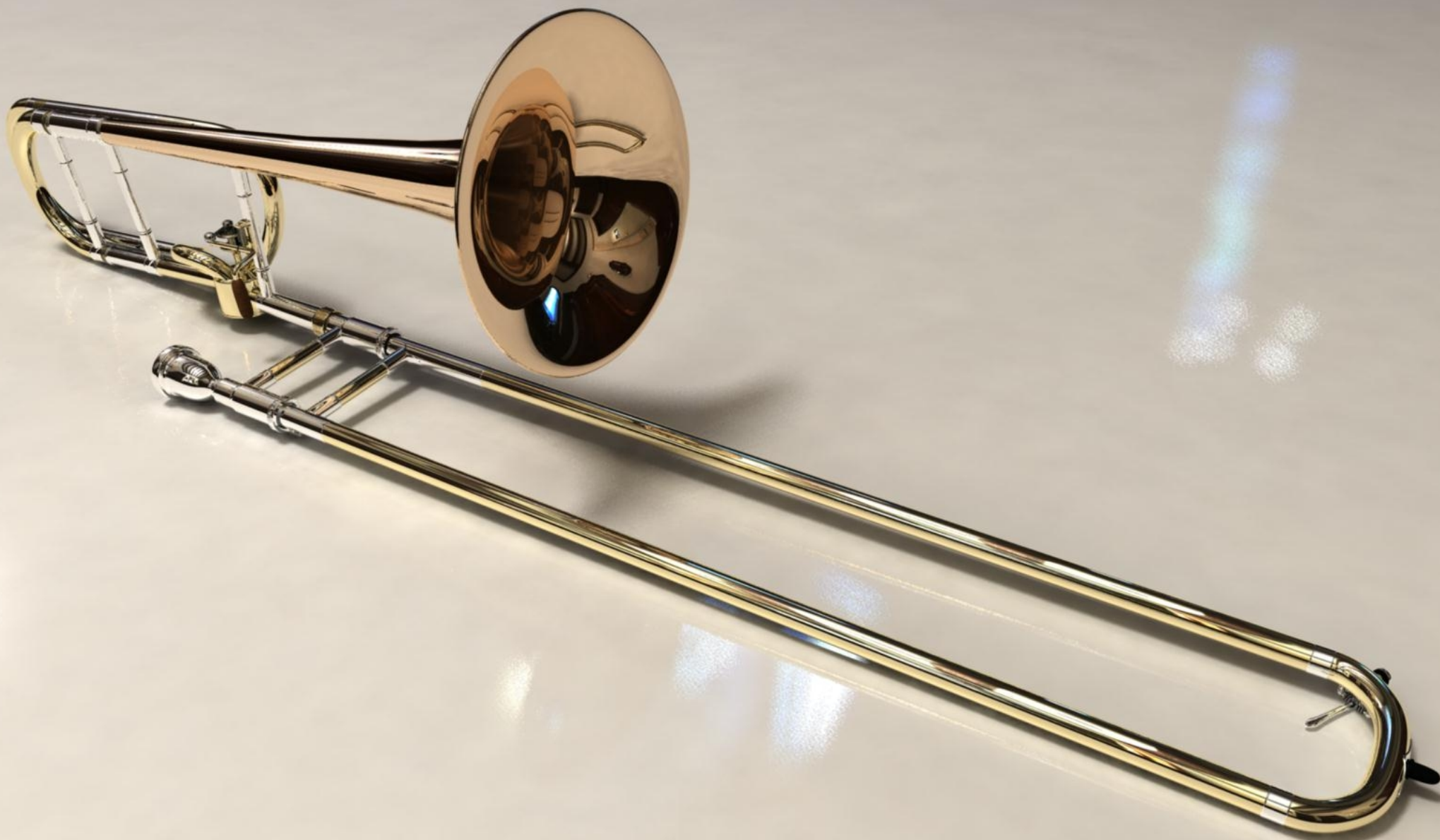
Detector







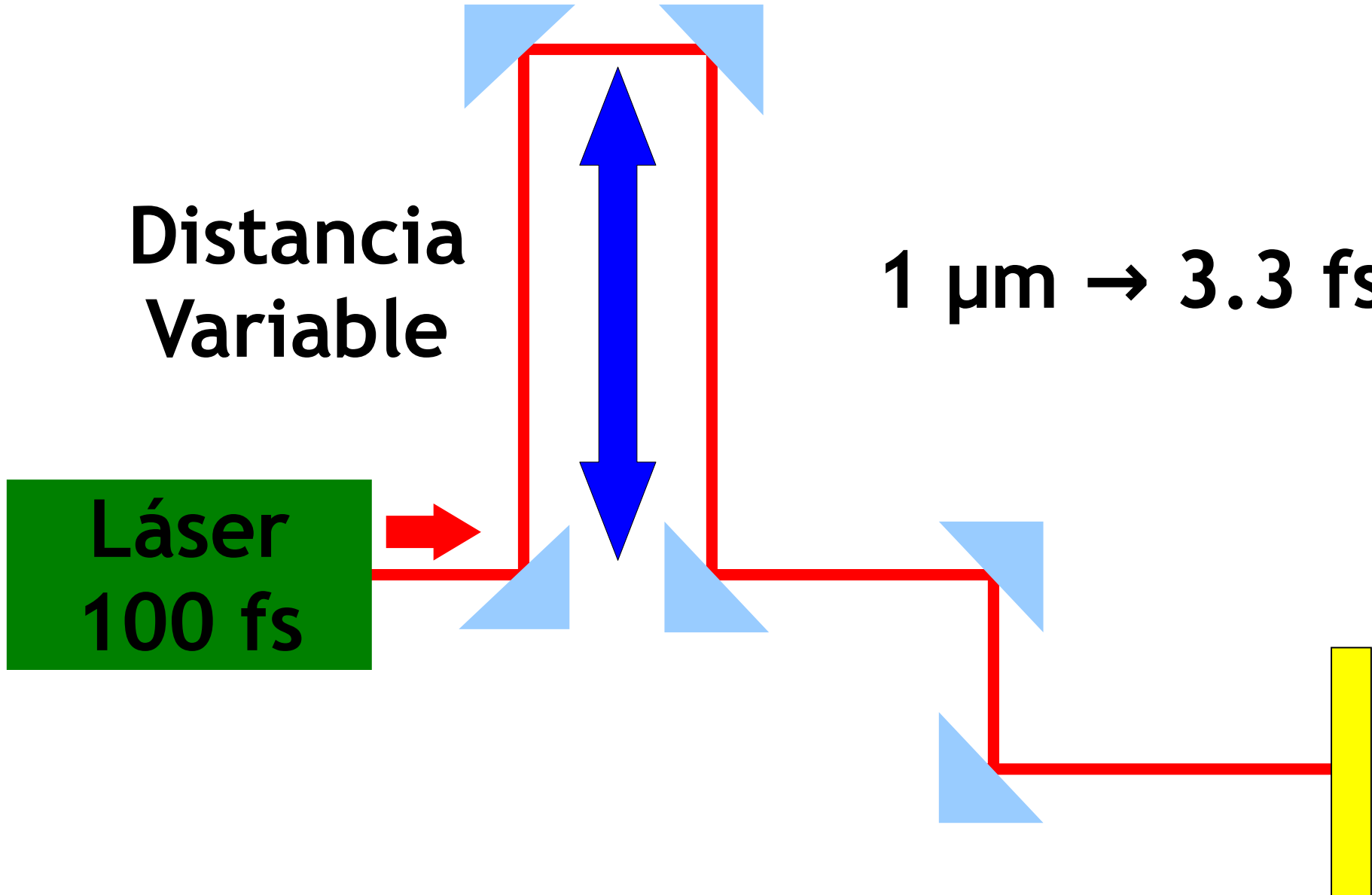




**Distancia
Variable**

1 μm $\rightarrow$ 3.3 fs

**Láser
100 fs**



100 ps

Probe

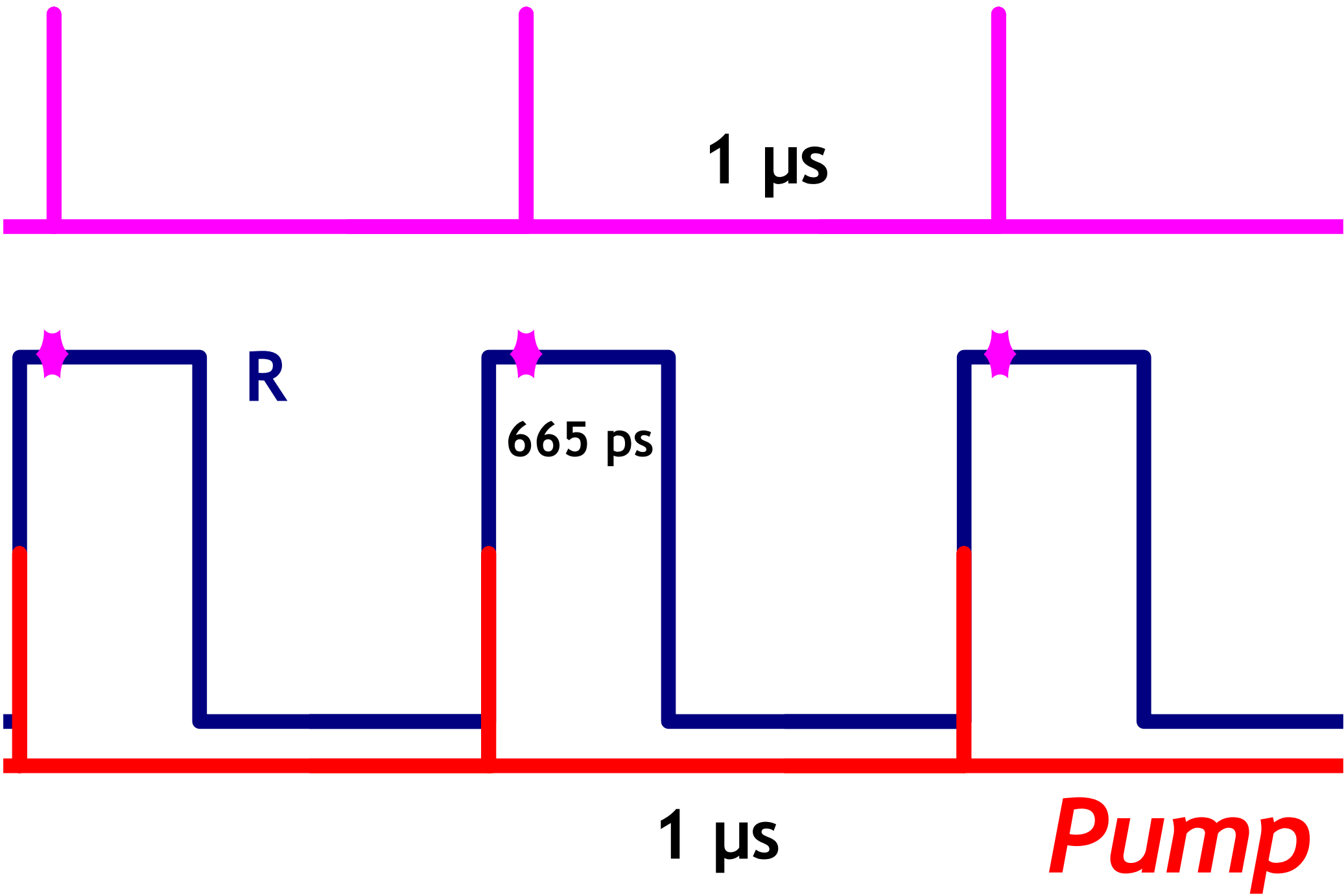
1 μ s

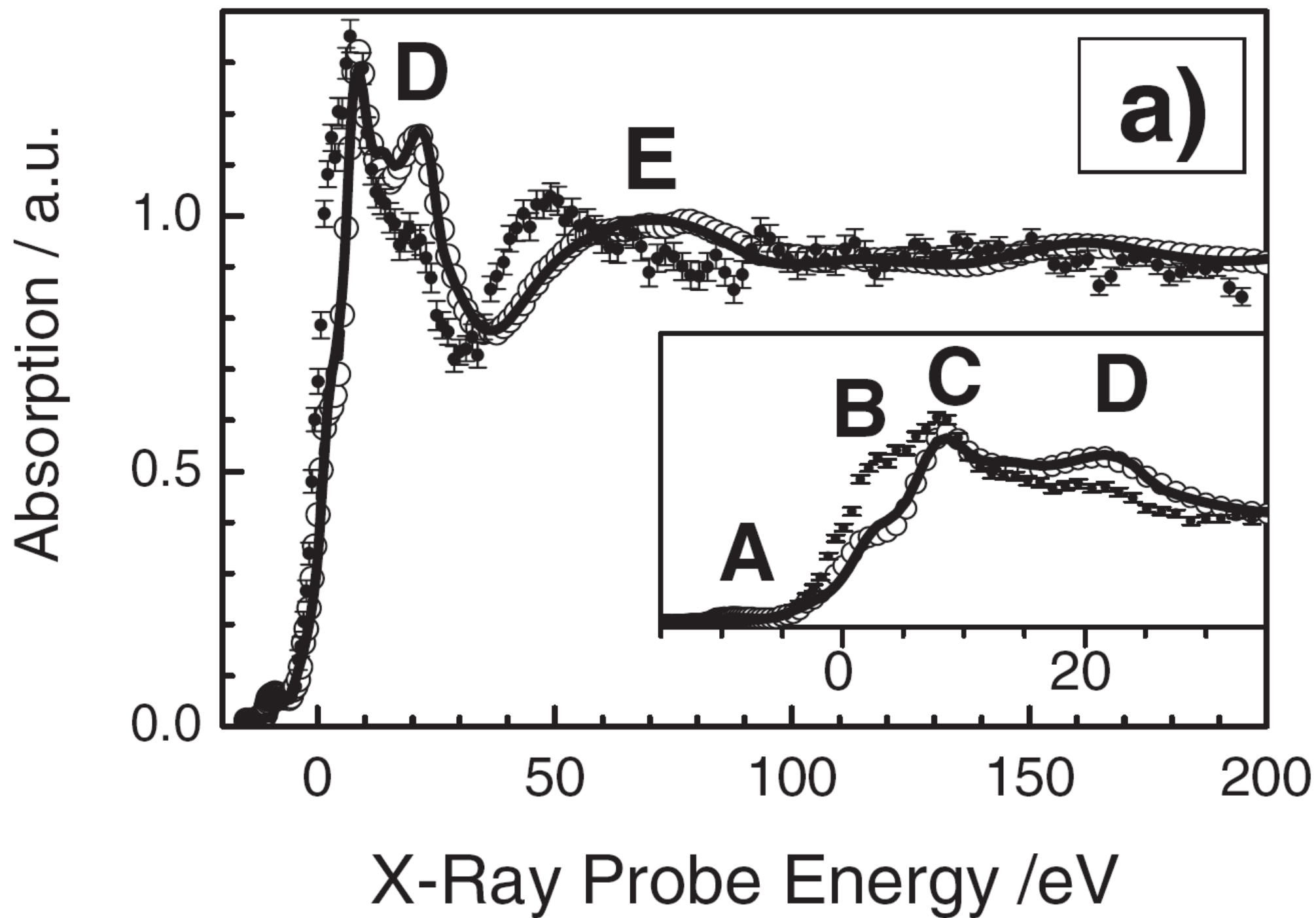
R

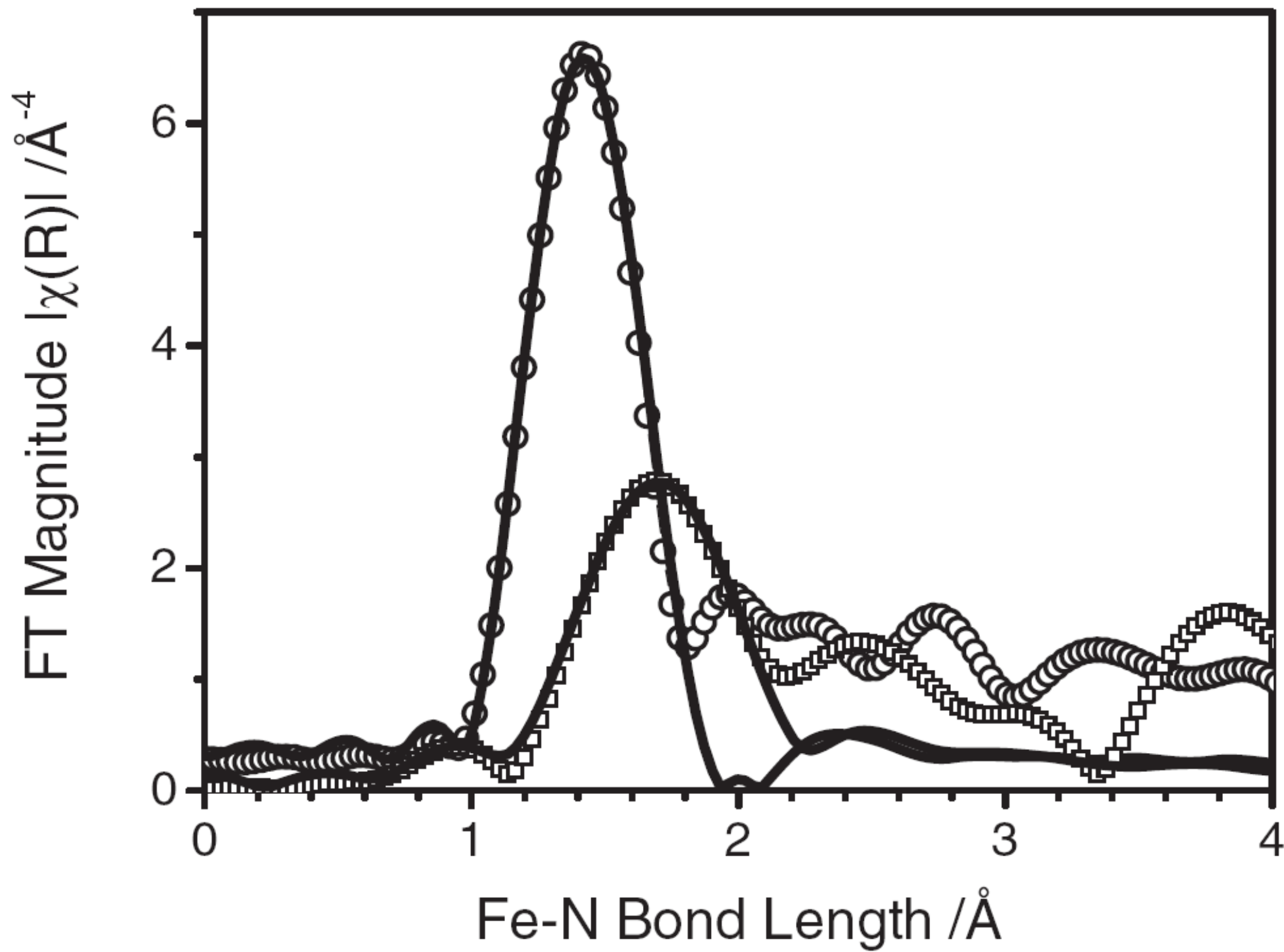
665 ps

1 μ s

Pump



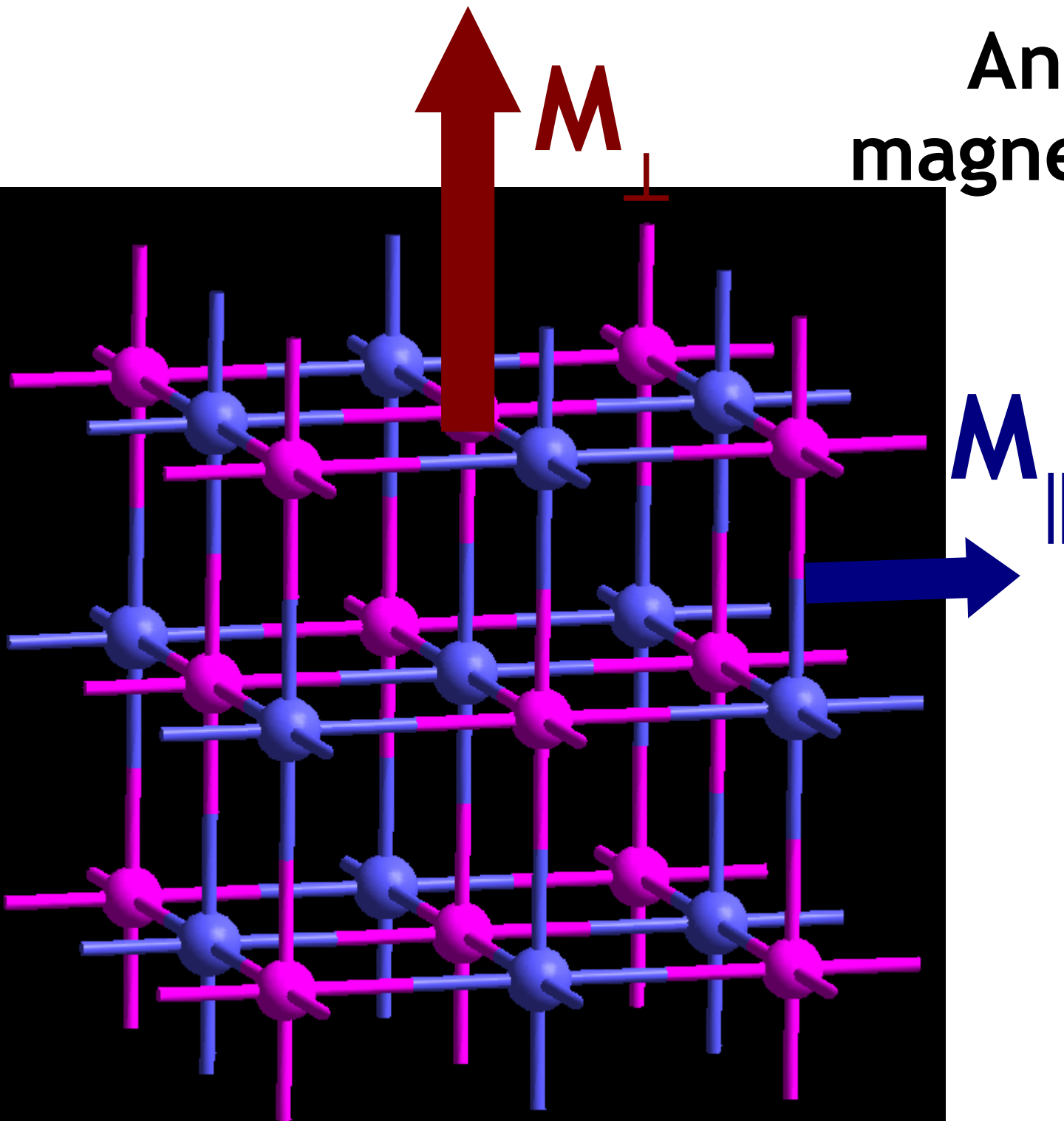


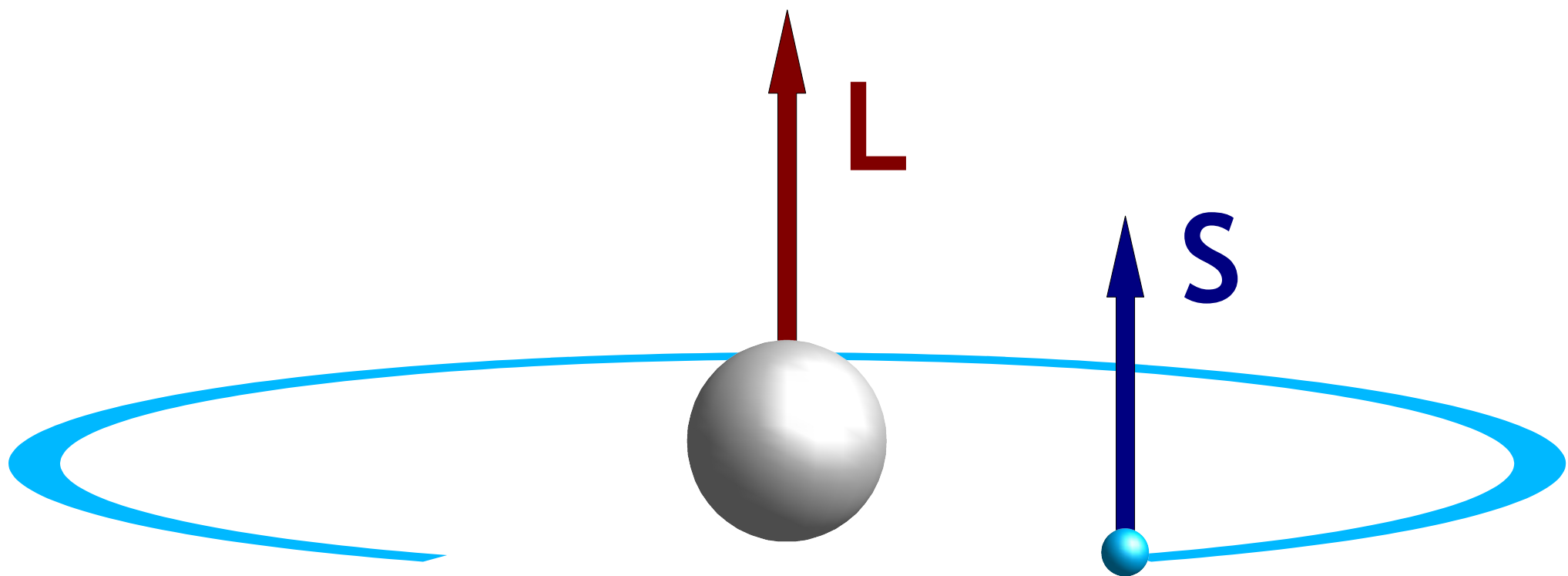


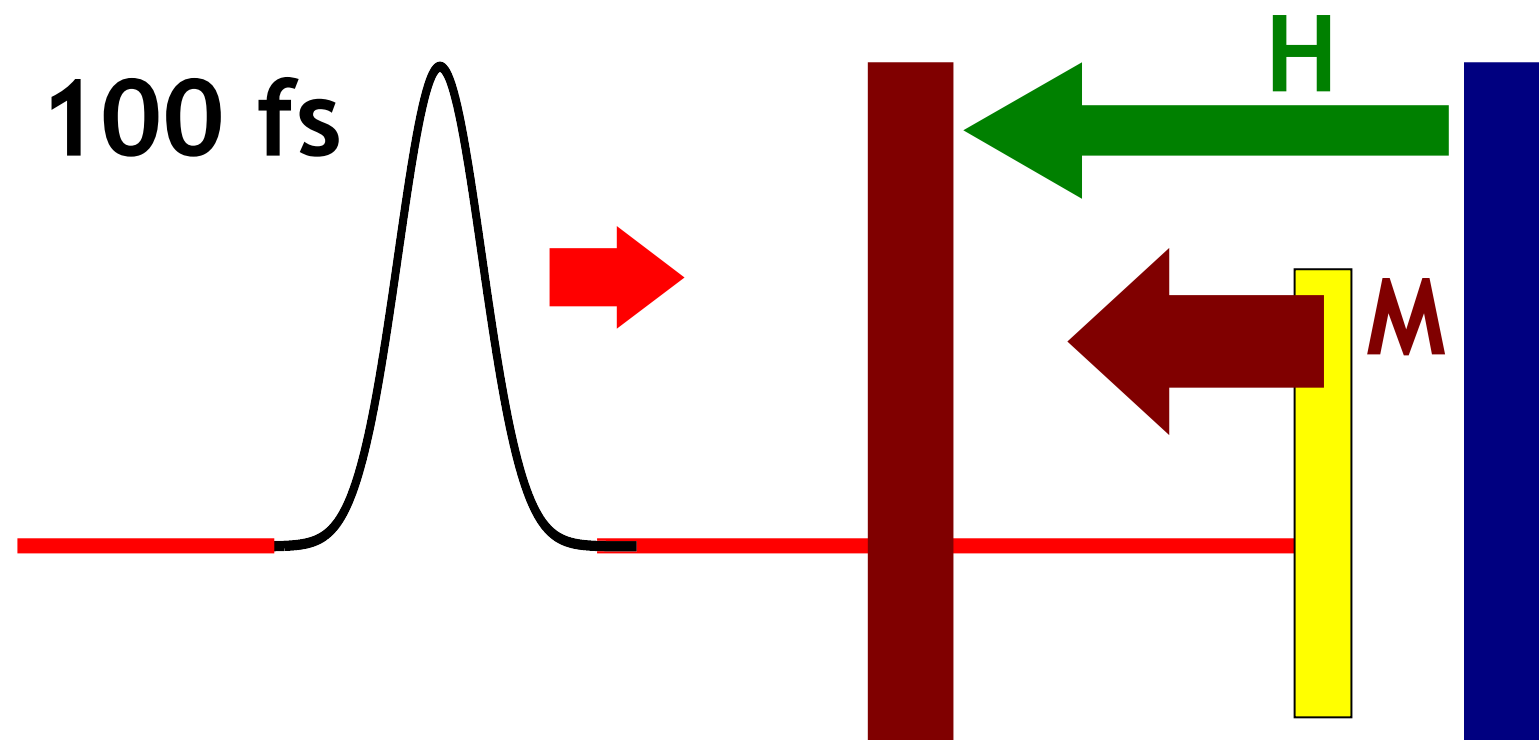
(4)

Dinámica del efecto magneto-óptico

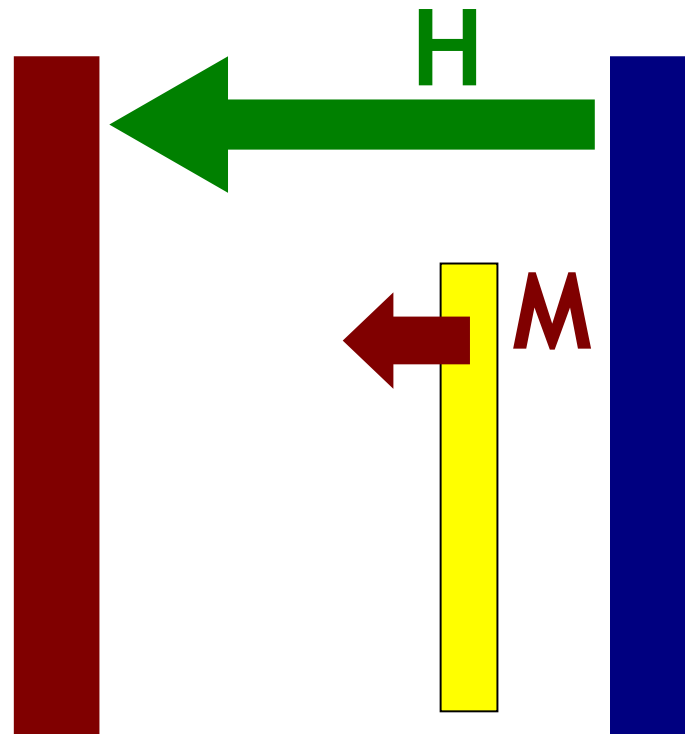
Anisotropía magnetocristalina



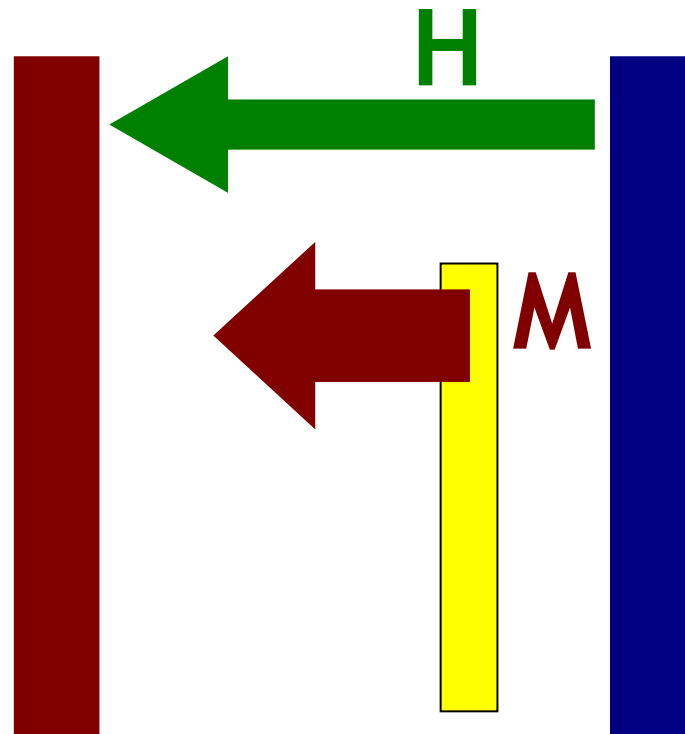




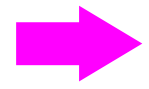
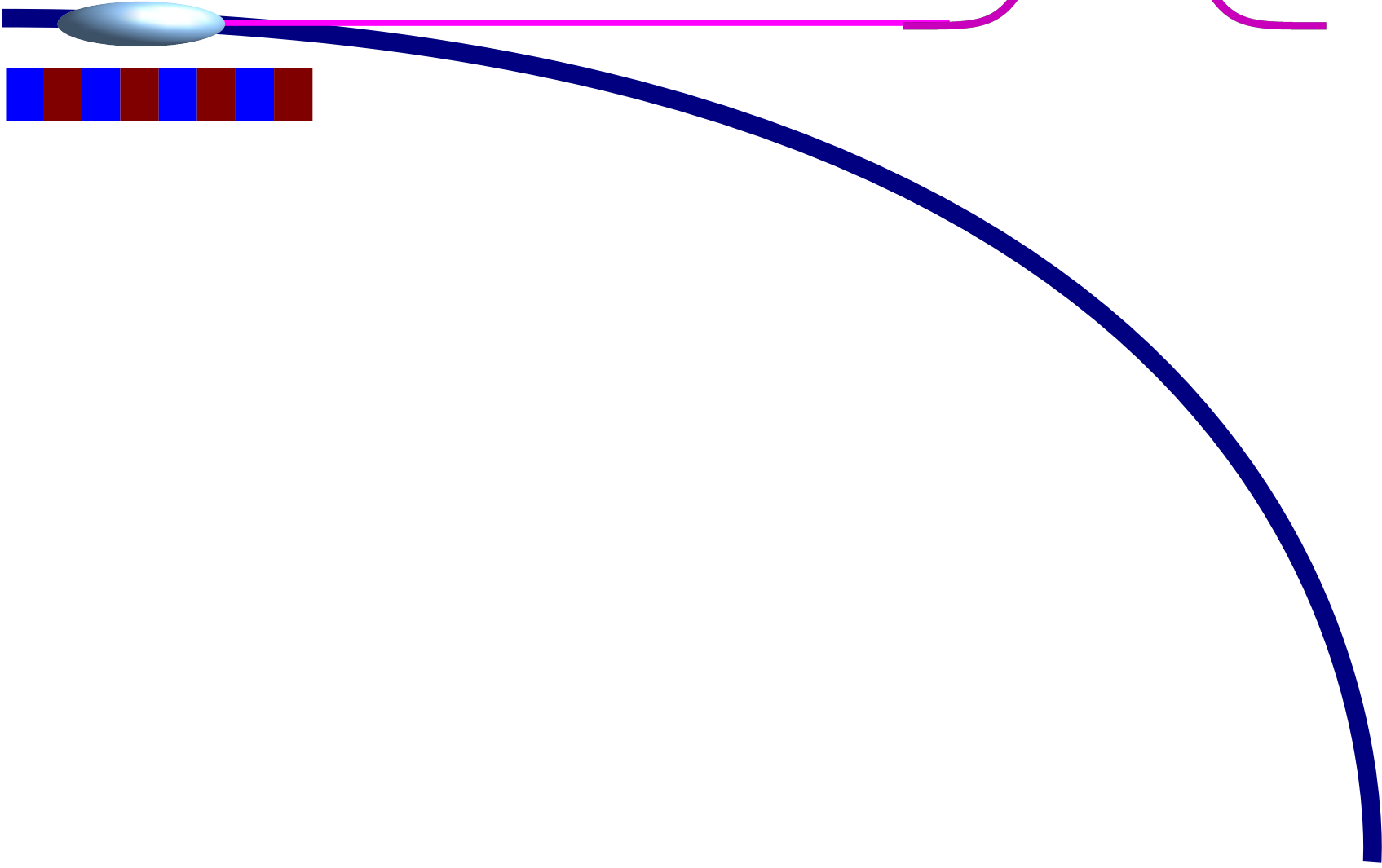
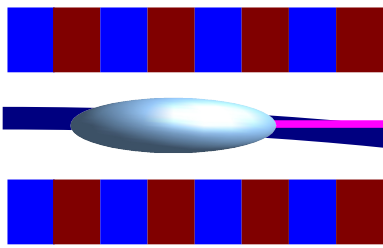
~ 1 ps



$\sim 1 \text{ ns}$

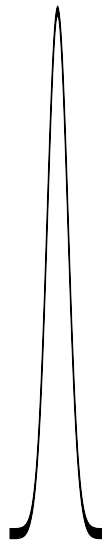




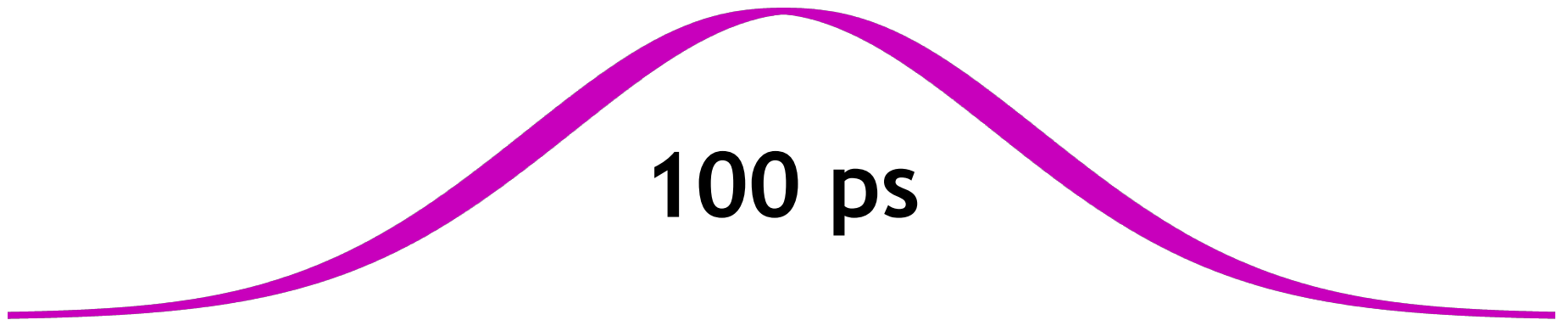


~ 100 ps

1 ps

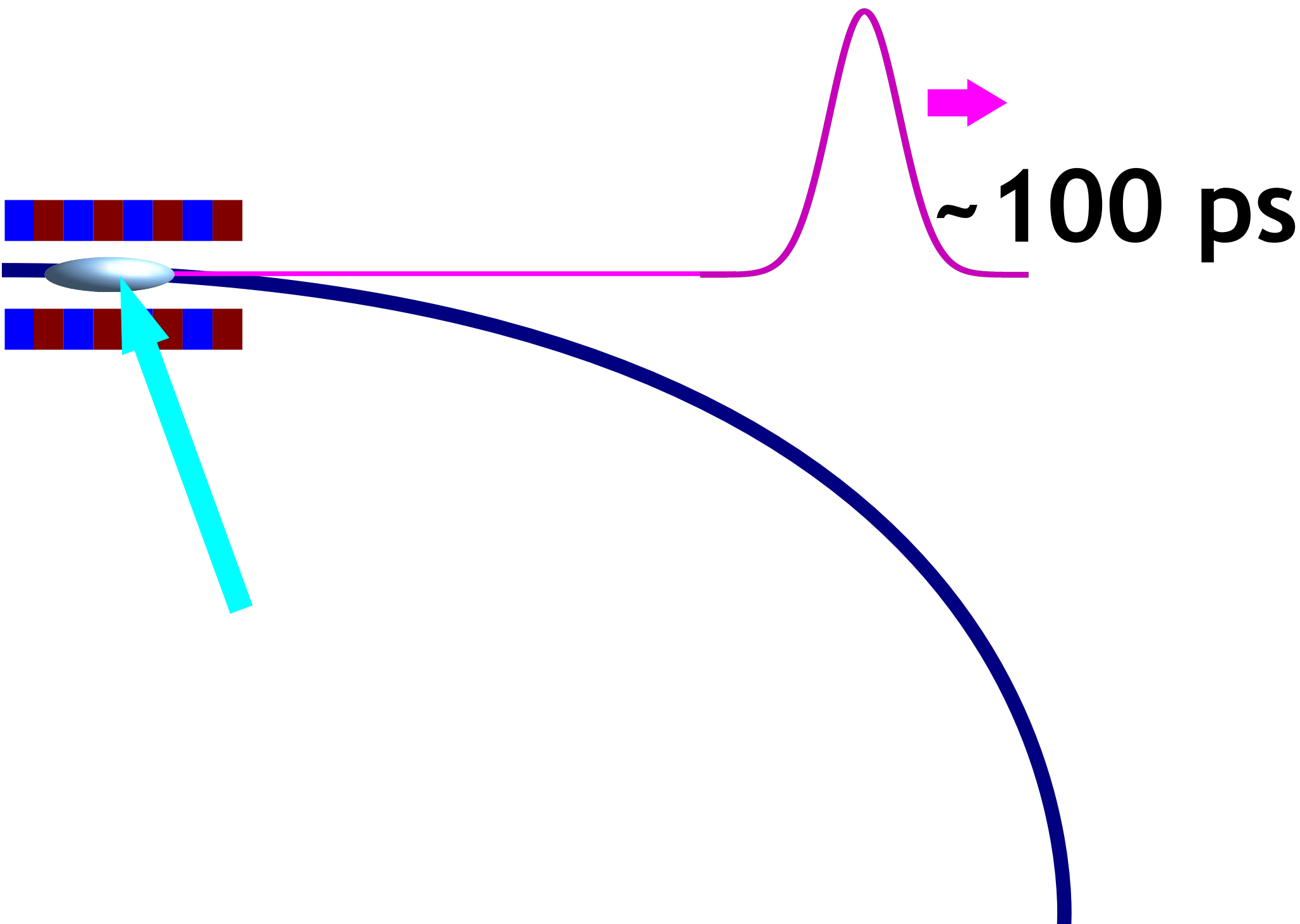


100 ps

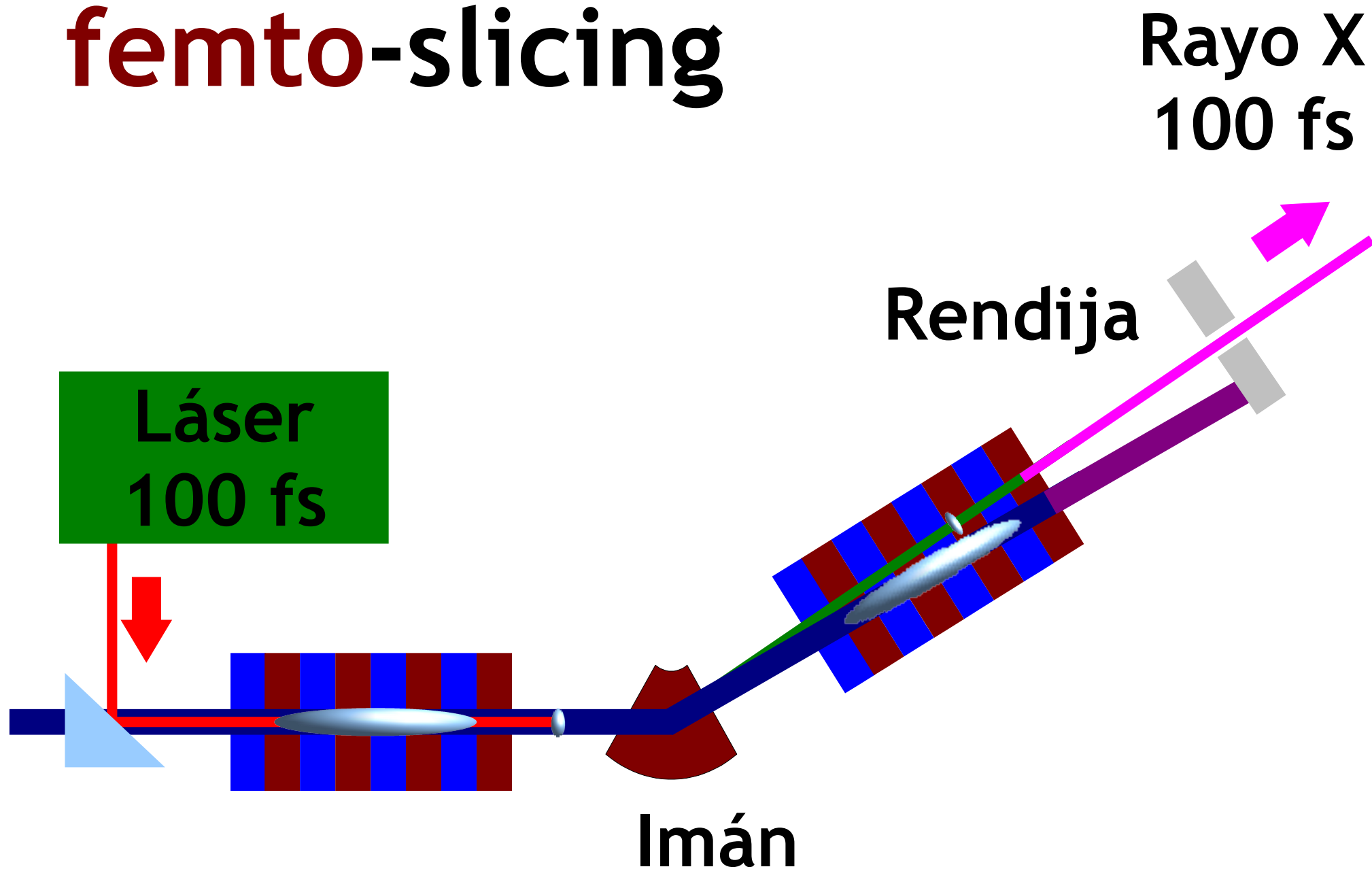


:- (

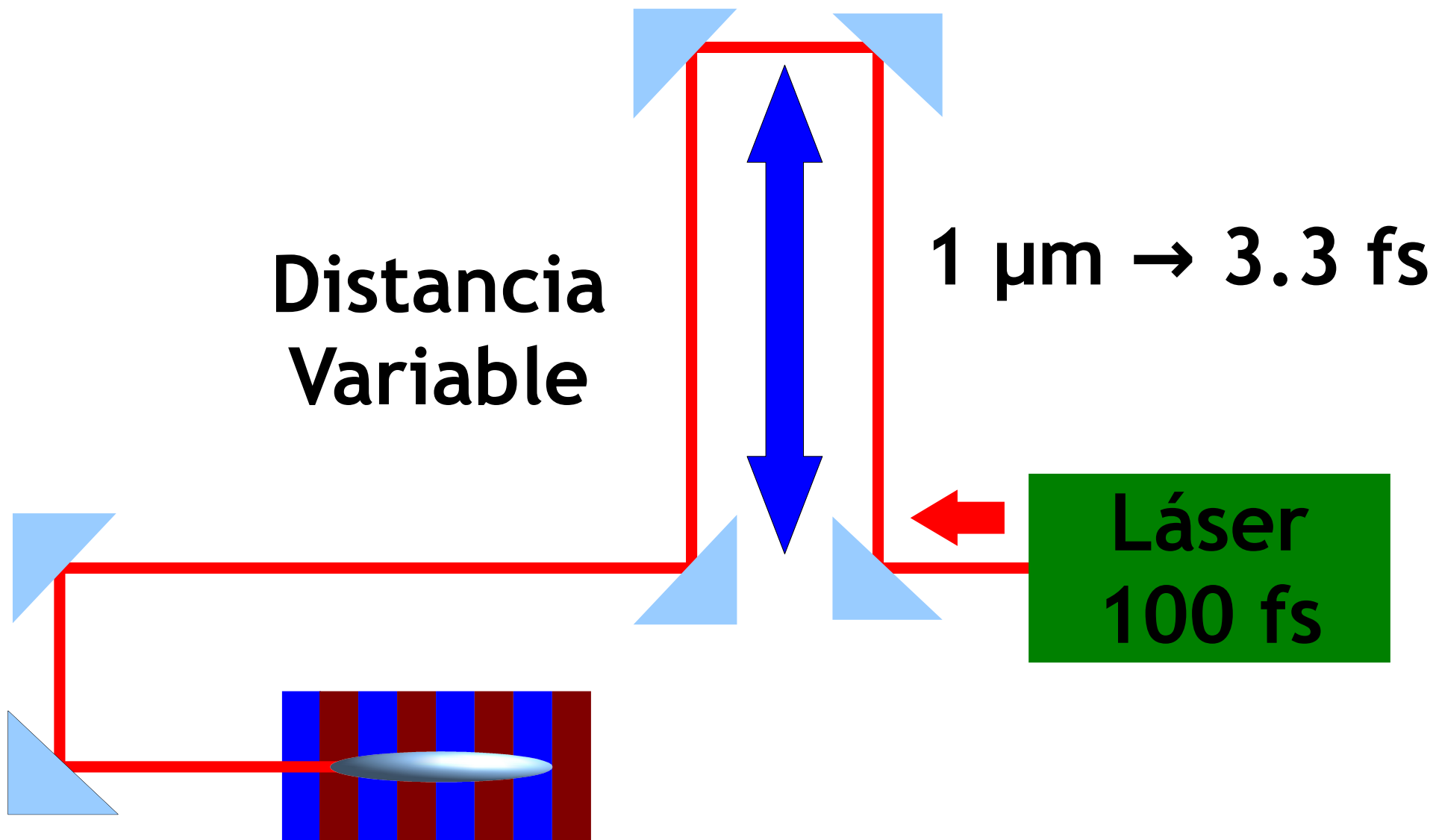


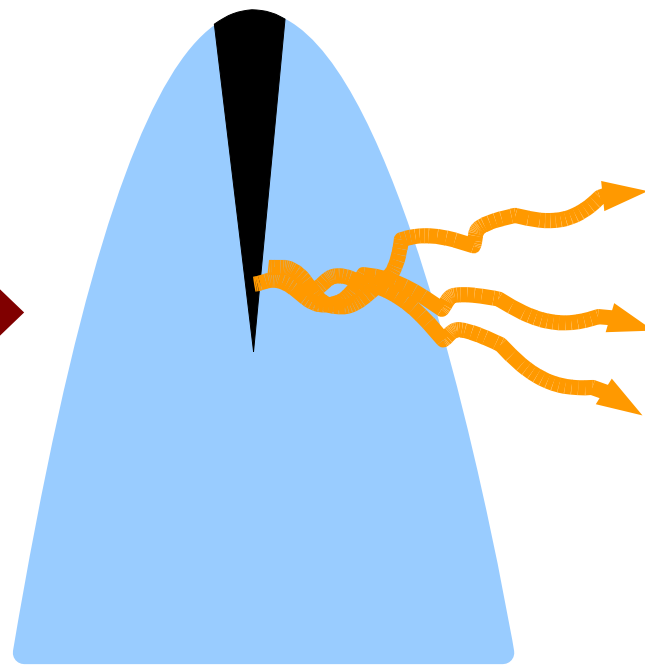
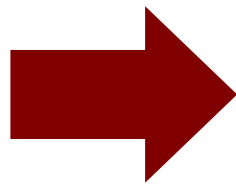
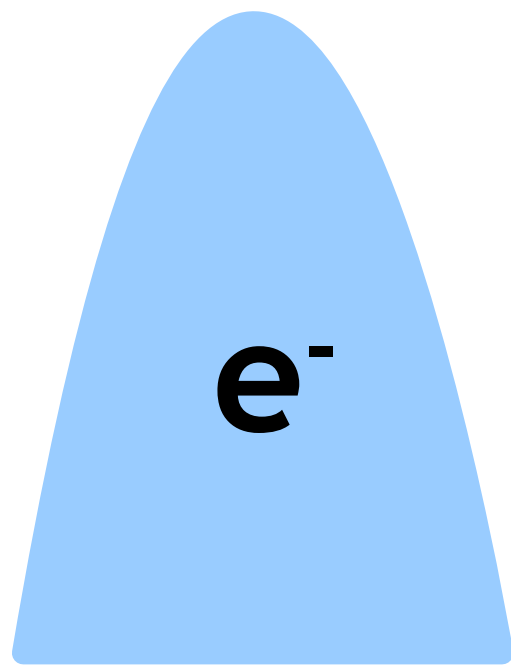


femto-slicing

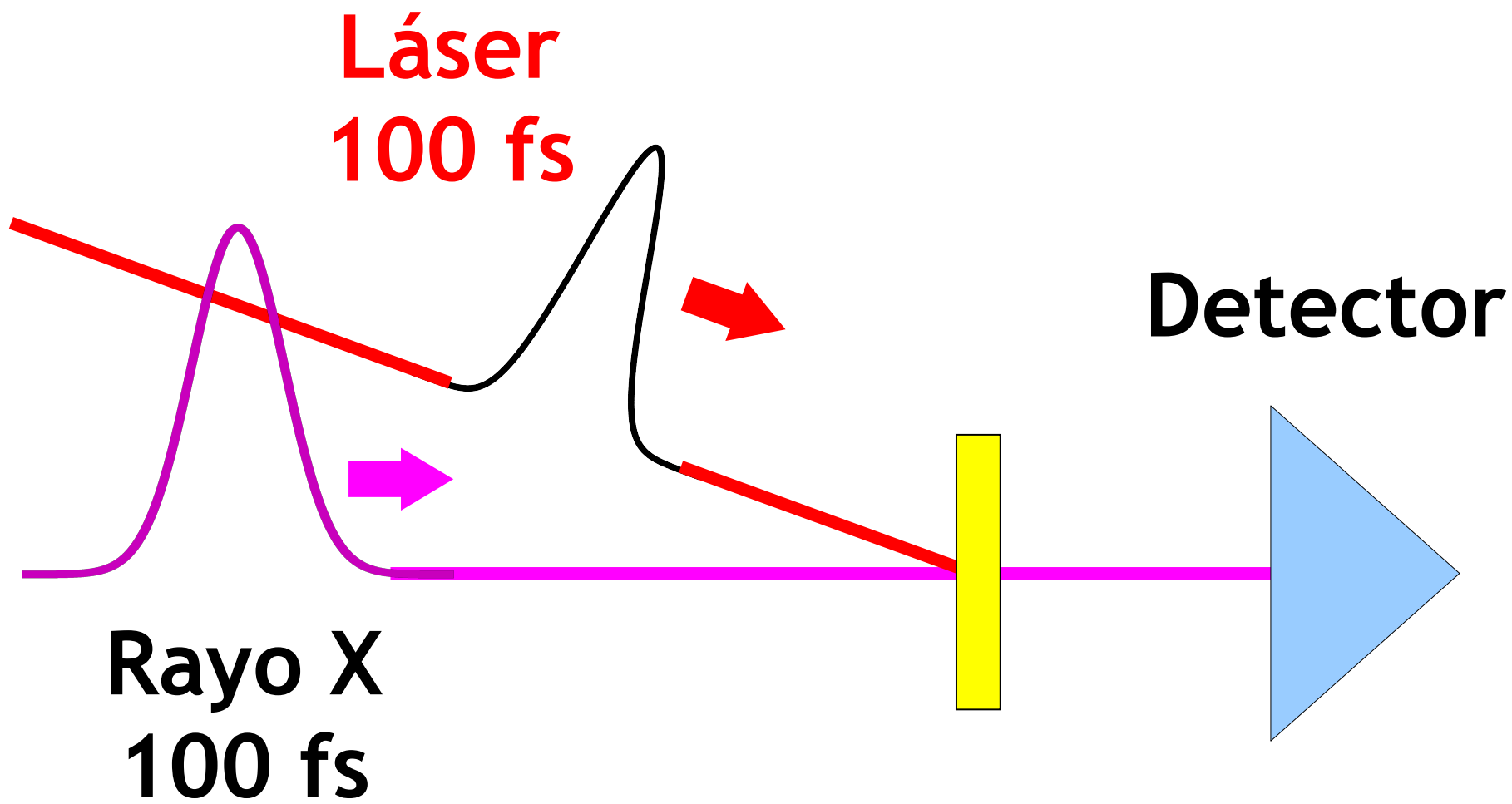








Infrarrojo

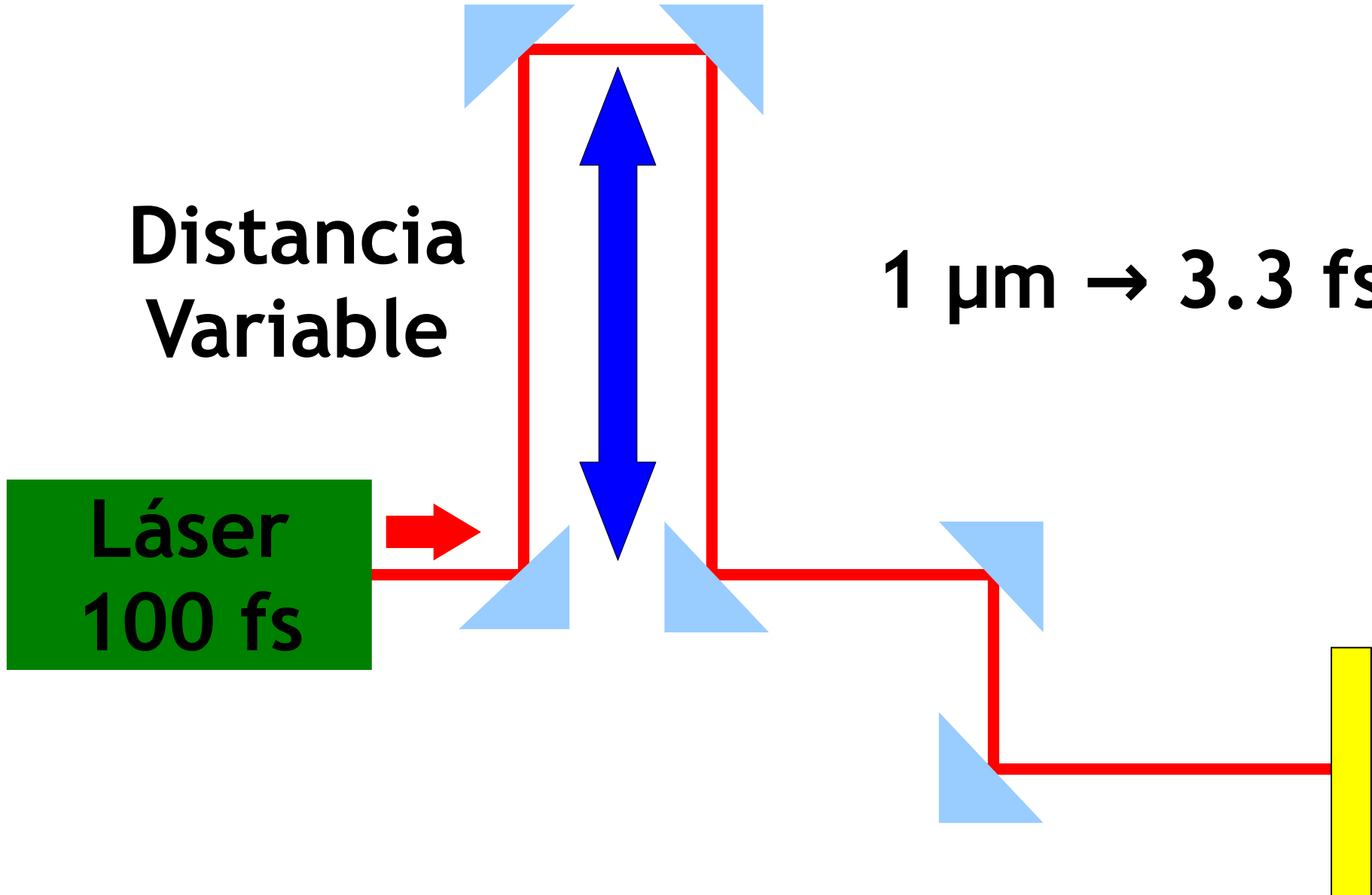


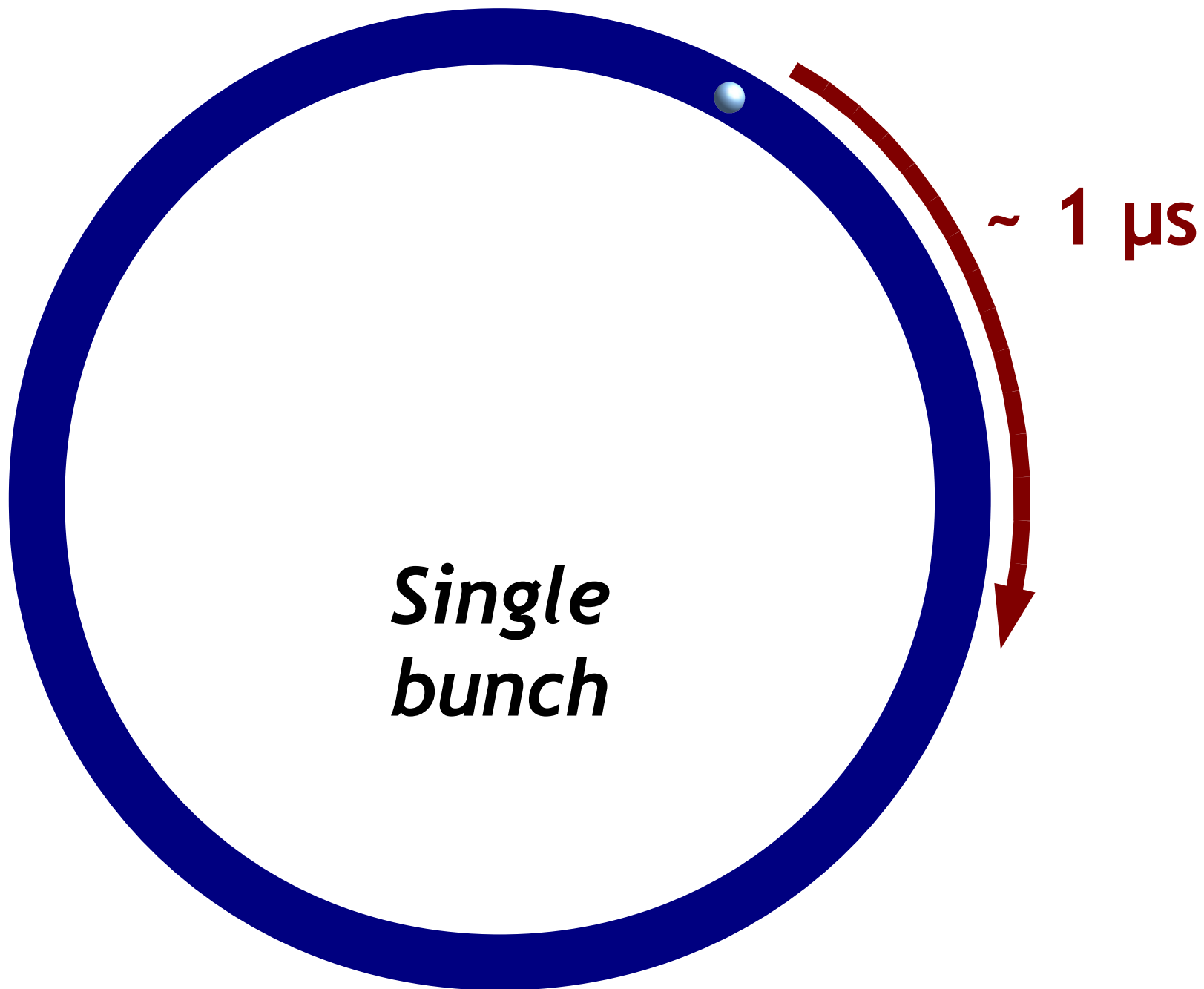


**Distancia
Variable**

1 μm $\rightarrow$ 3.3 fs

**Láser
100 fs**





100 fs

Probe

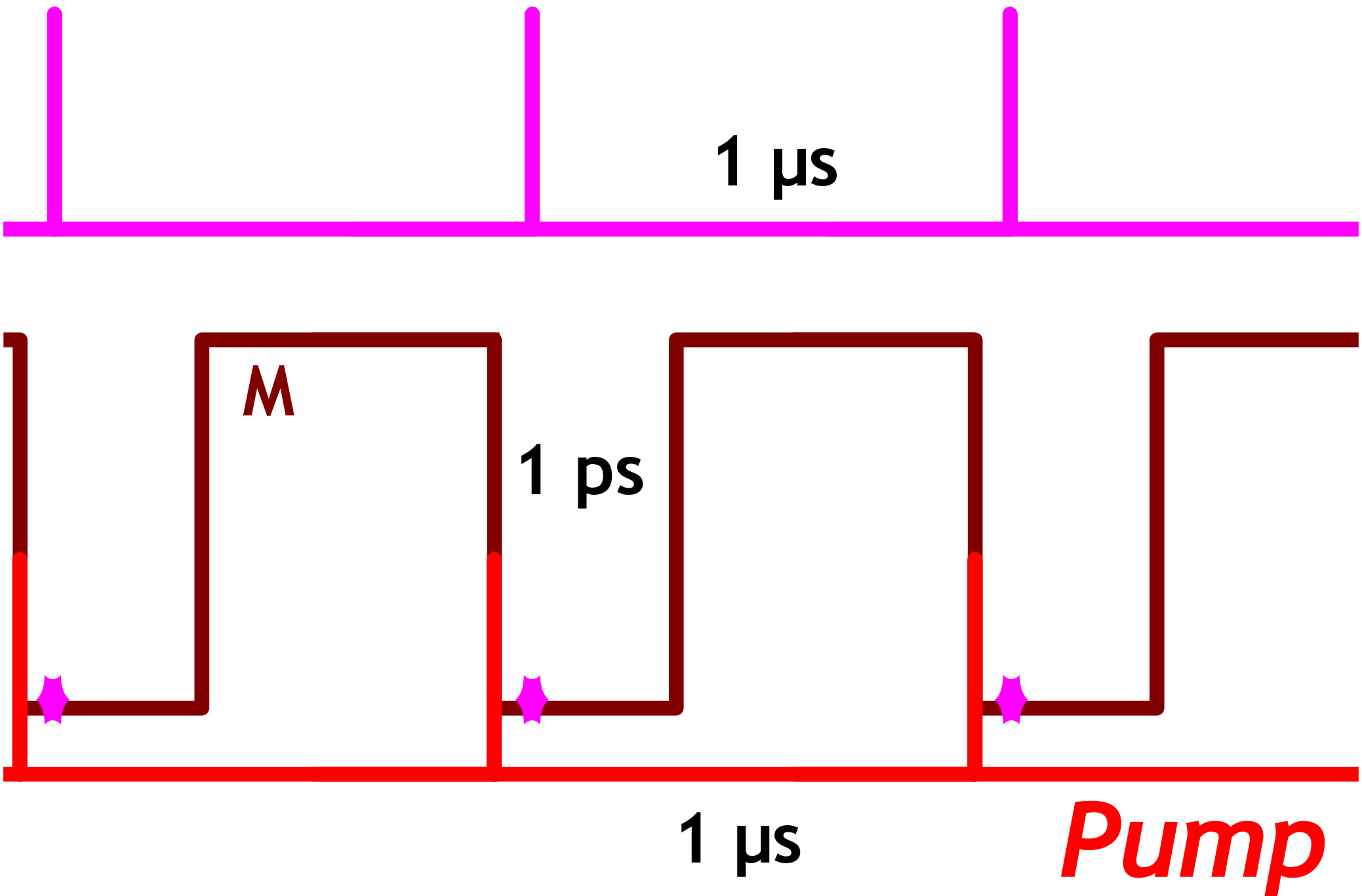
1 μ s

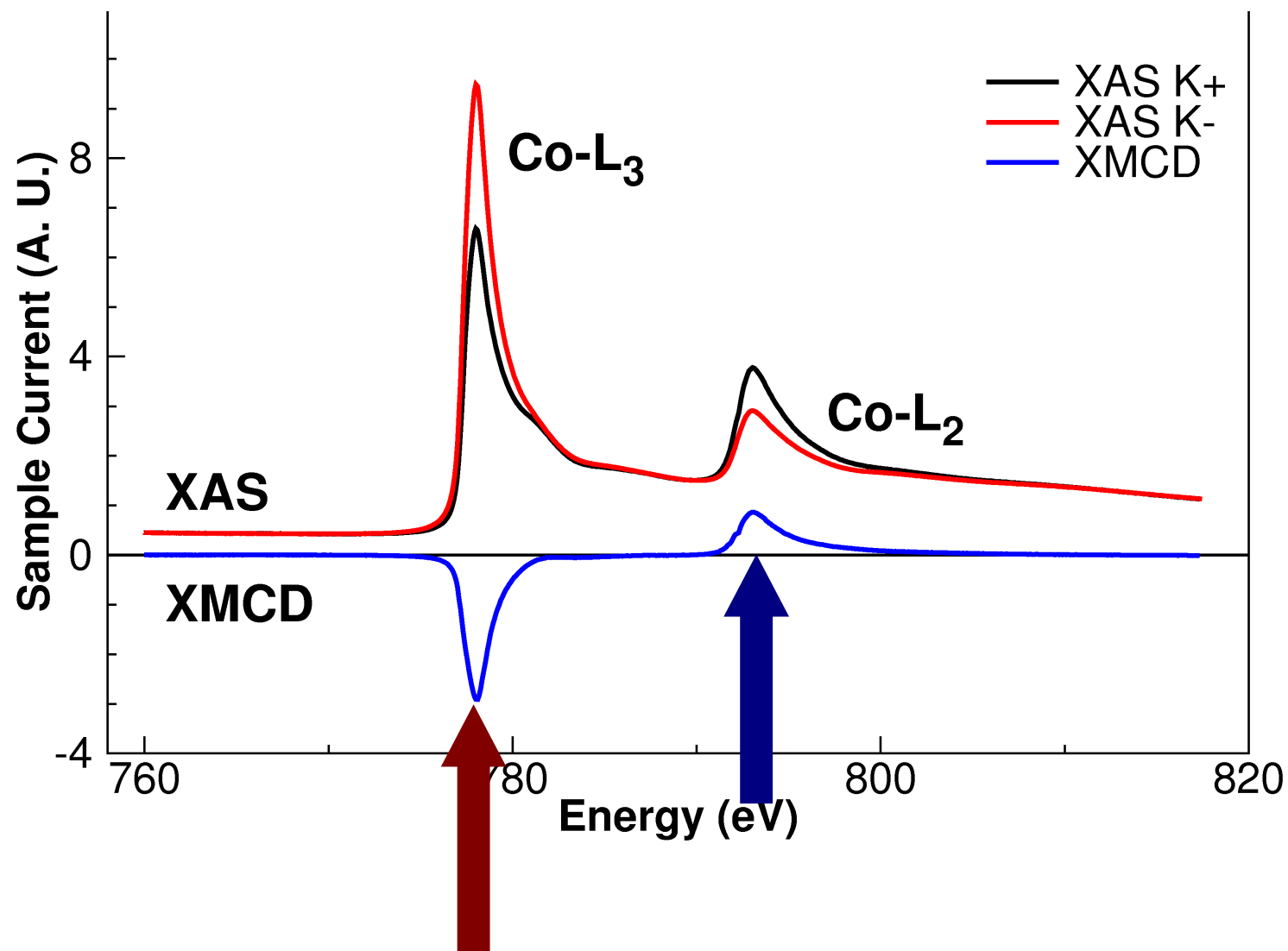
M

1 ps

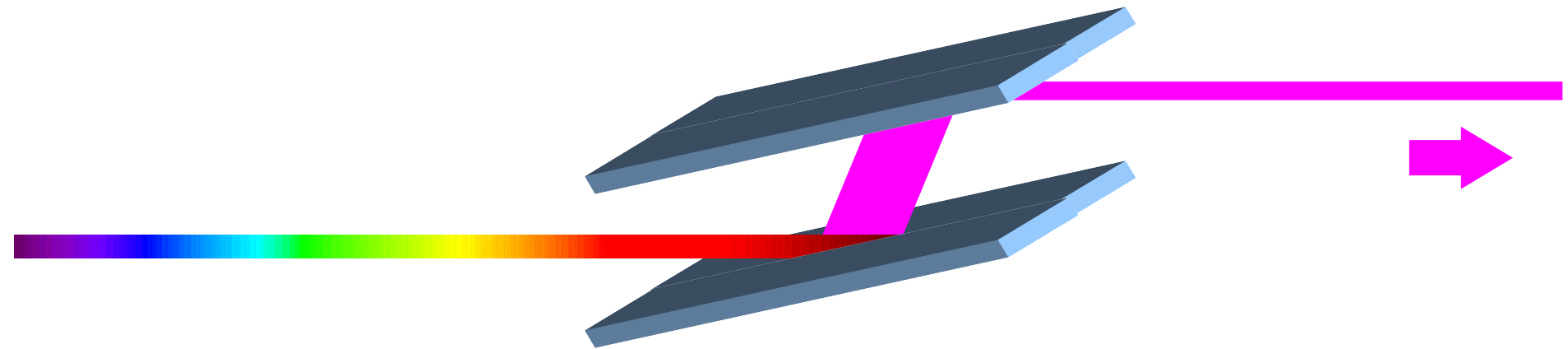
1 μ s

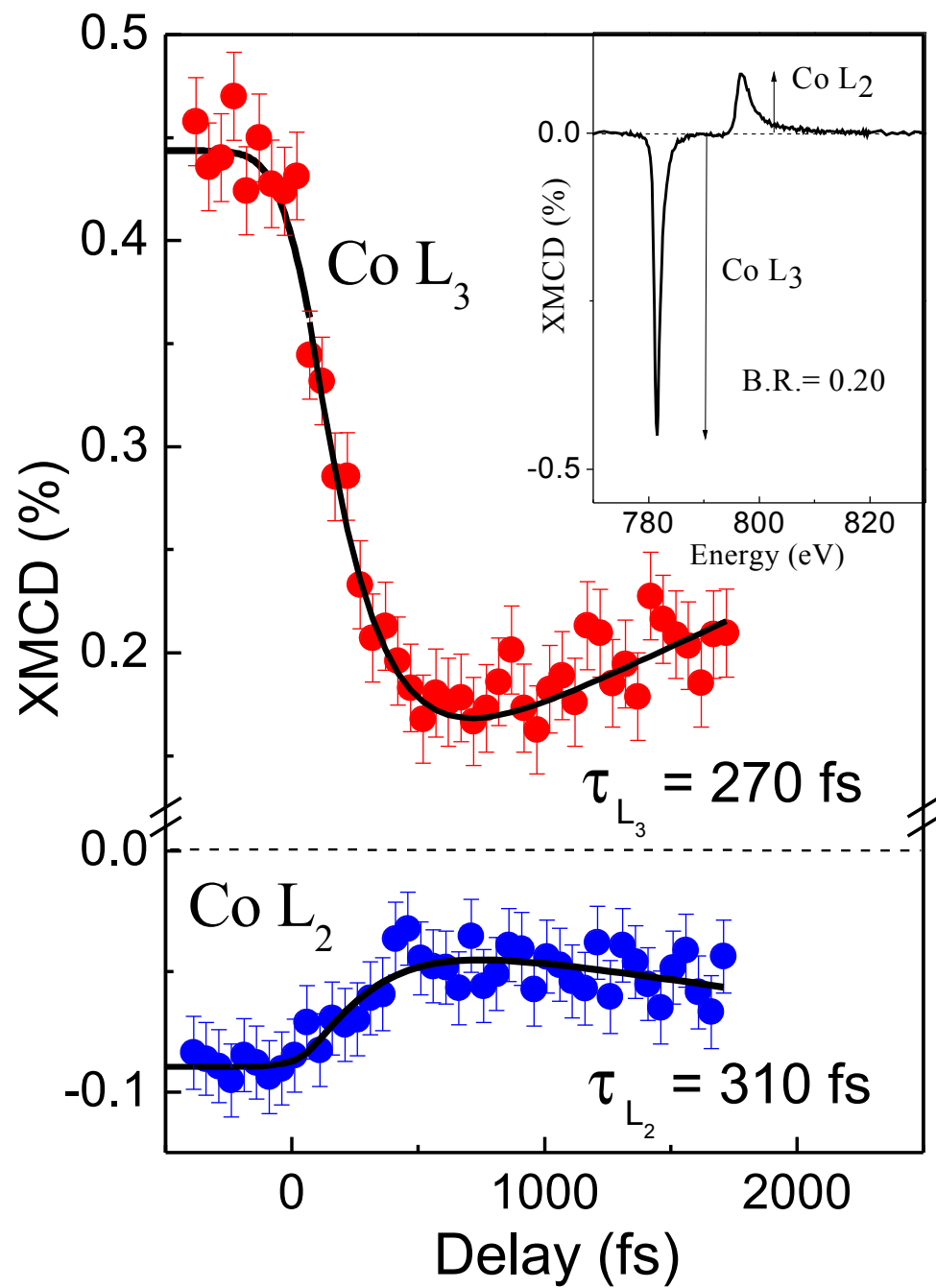
Pump

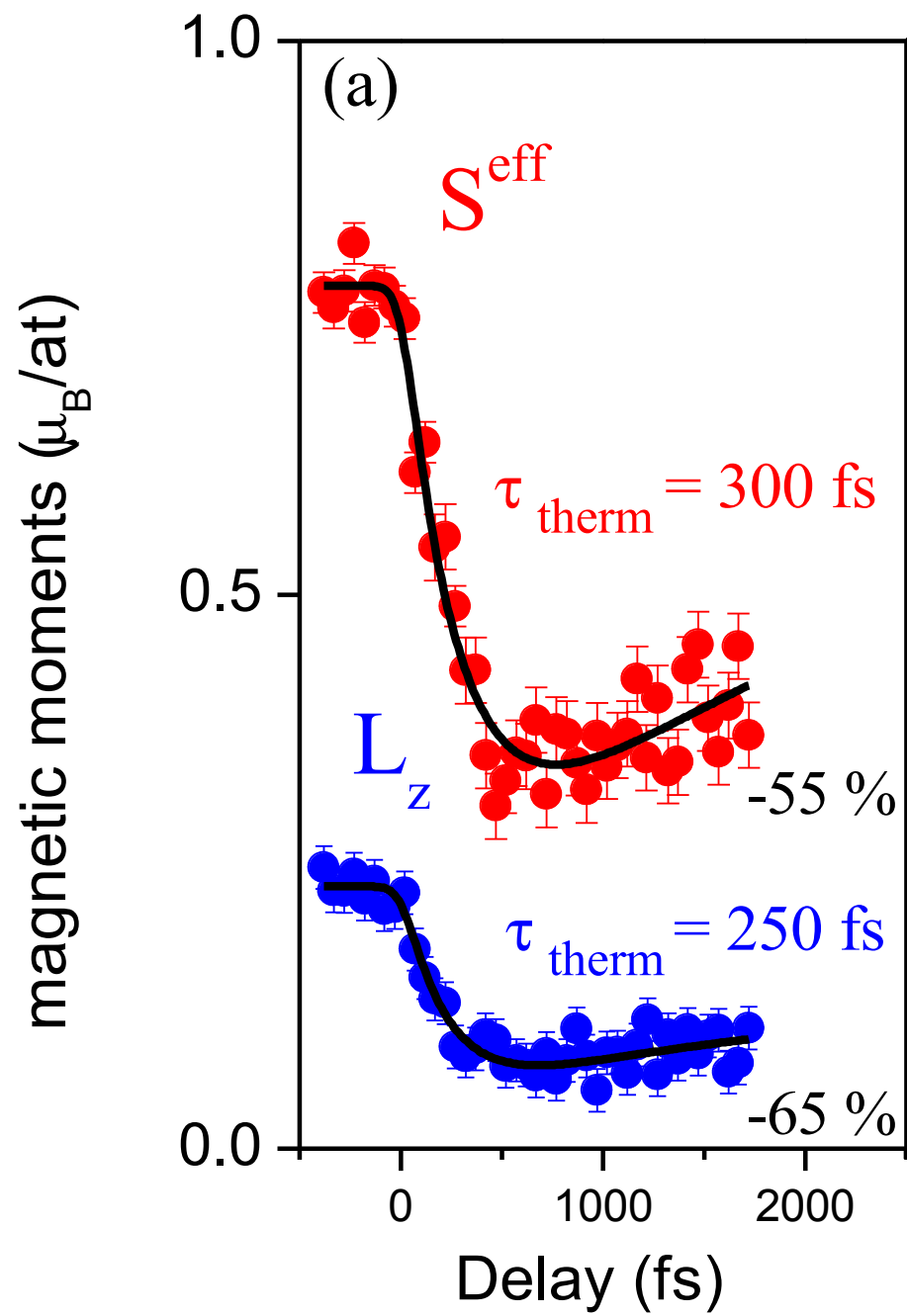




Energía fija... :-)

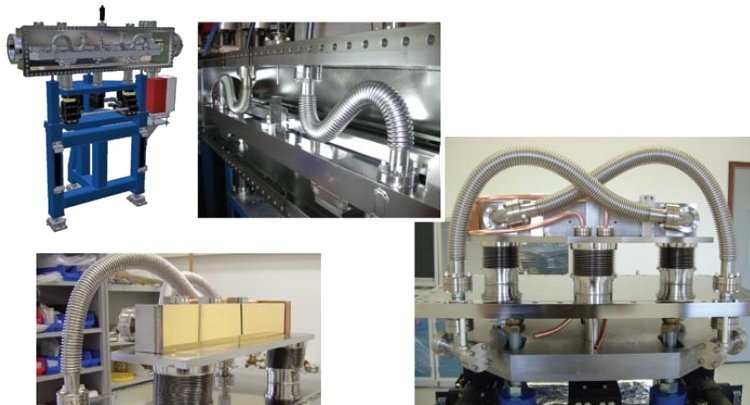




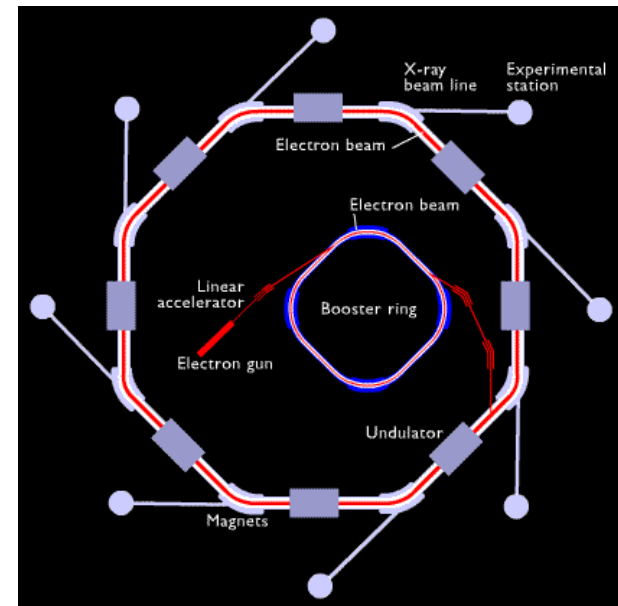


Resumen

Instrumentos



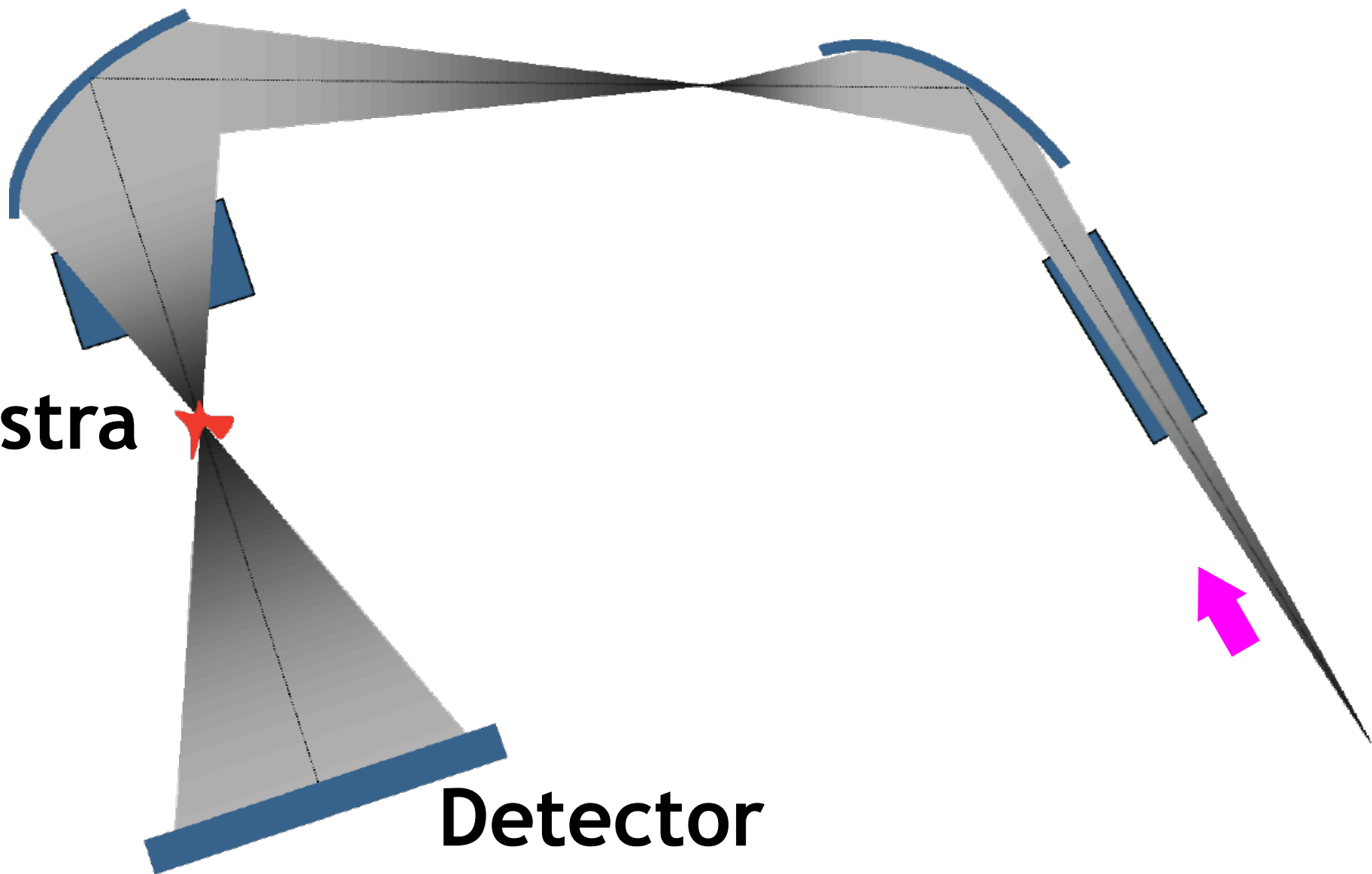
Fuente



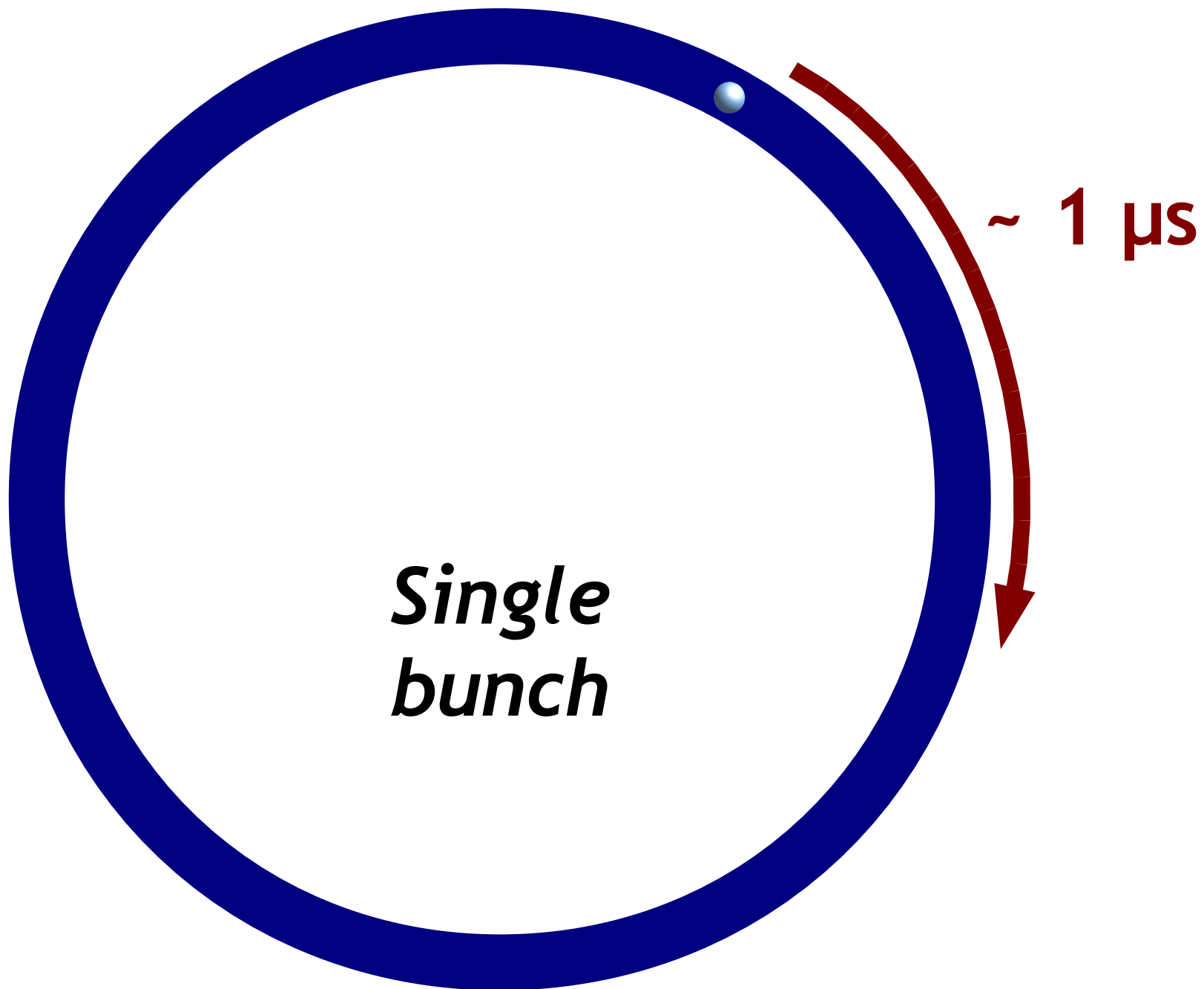
Policromador

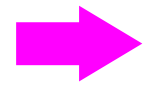
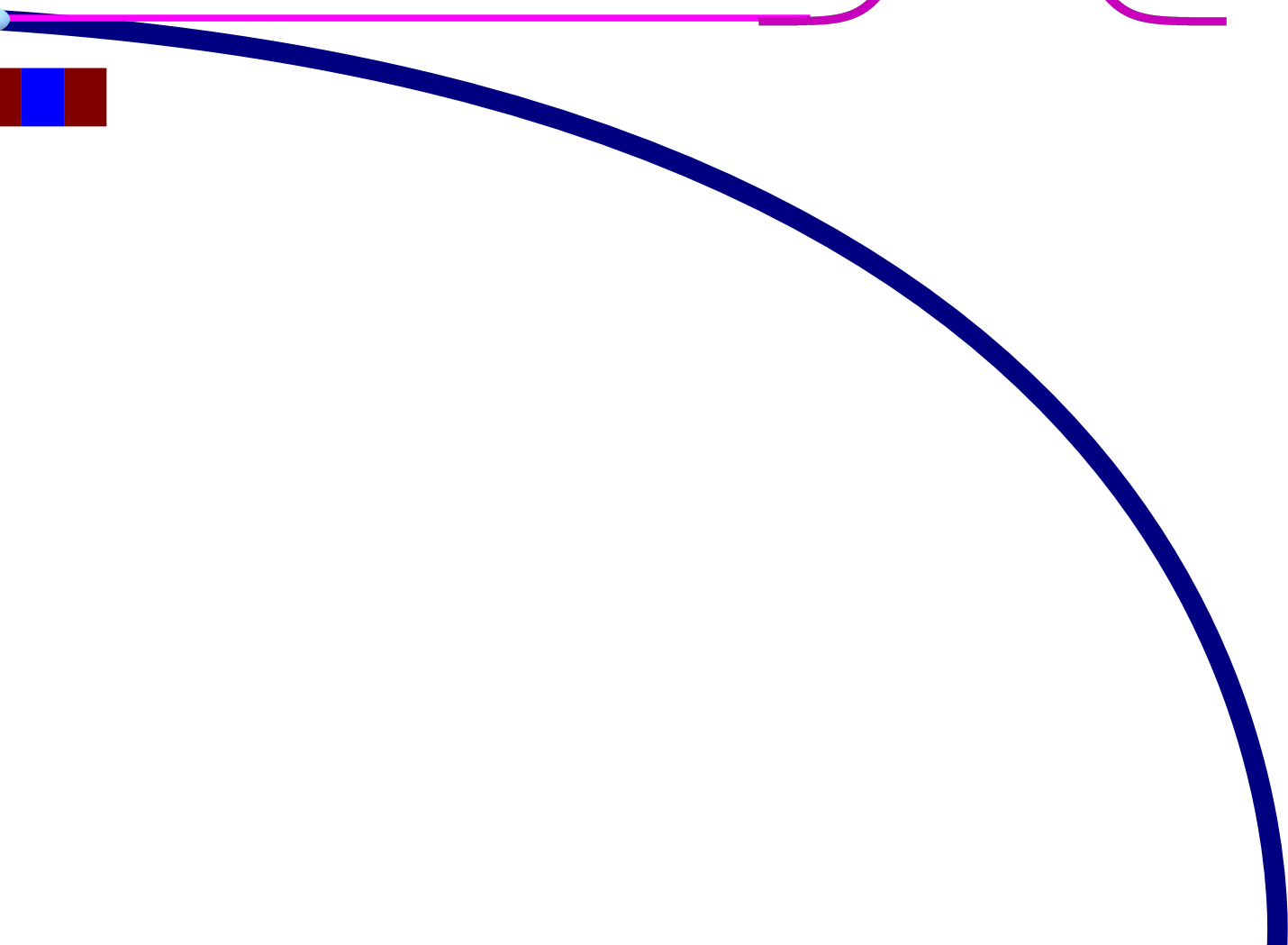
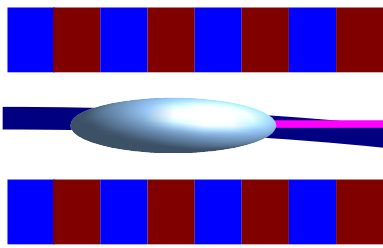
Muestra

Detector





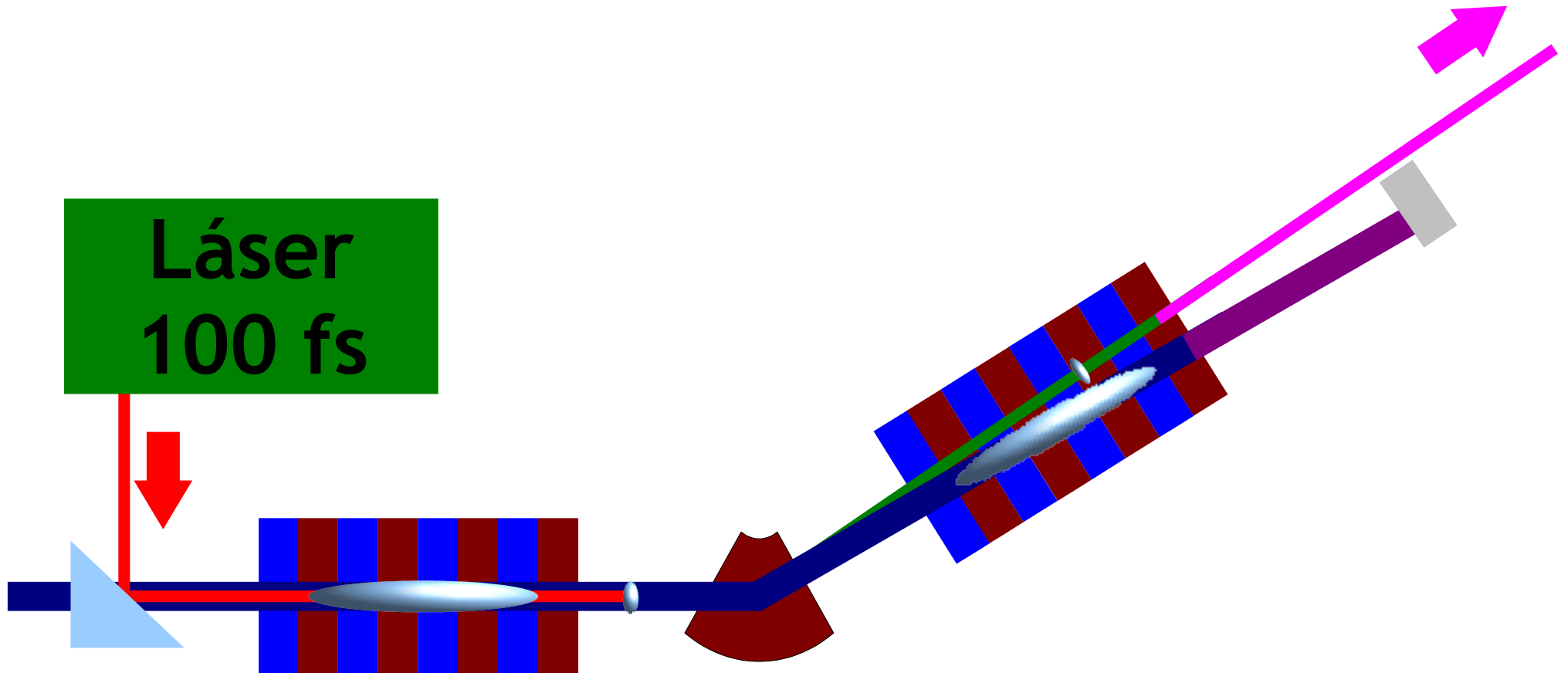




~ 100 ps

femto-slicing

Rayo X
100 fs



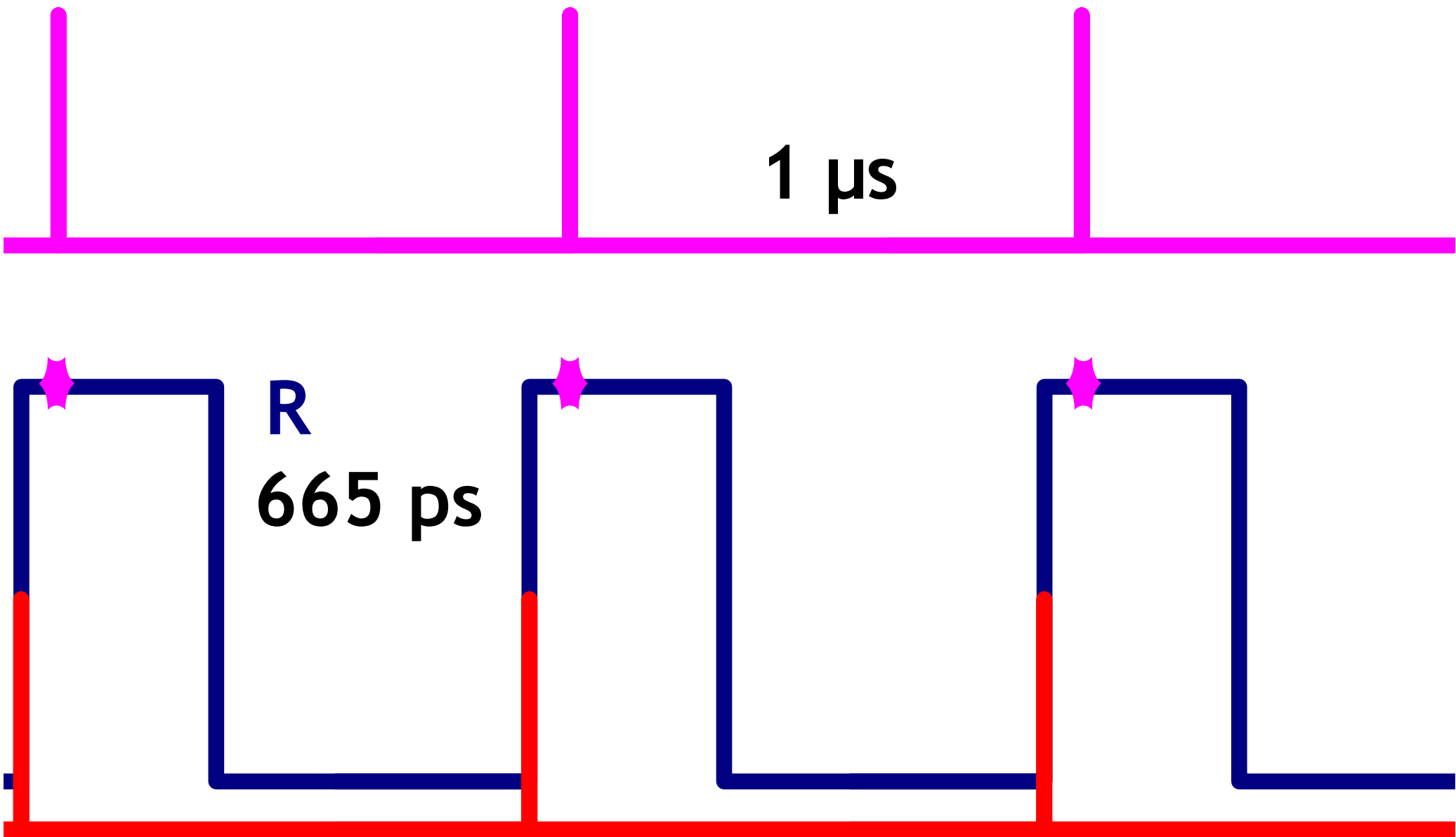
100 ps

Probe

1 μ s

R
665 ps

Pump





Fin*



* Salvo preguntas

Víctor López Flores



Experimentos resueltos en tiempo*

*en un
sincrotrón