

Dynamique femtoseconde d'un système complexe
Femtosecond dynamics of a complex system

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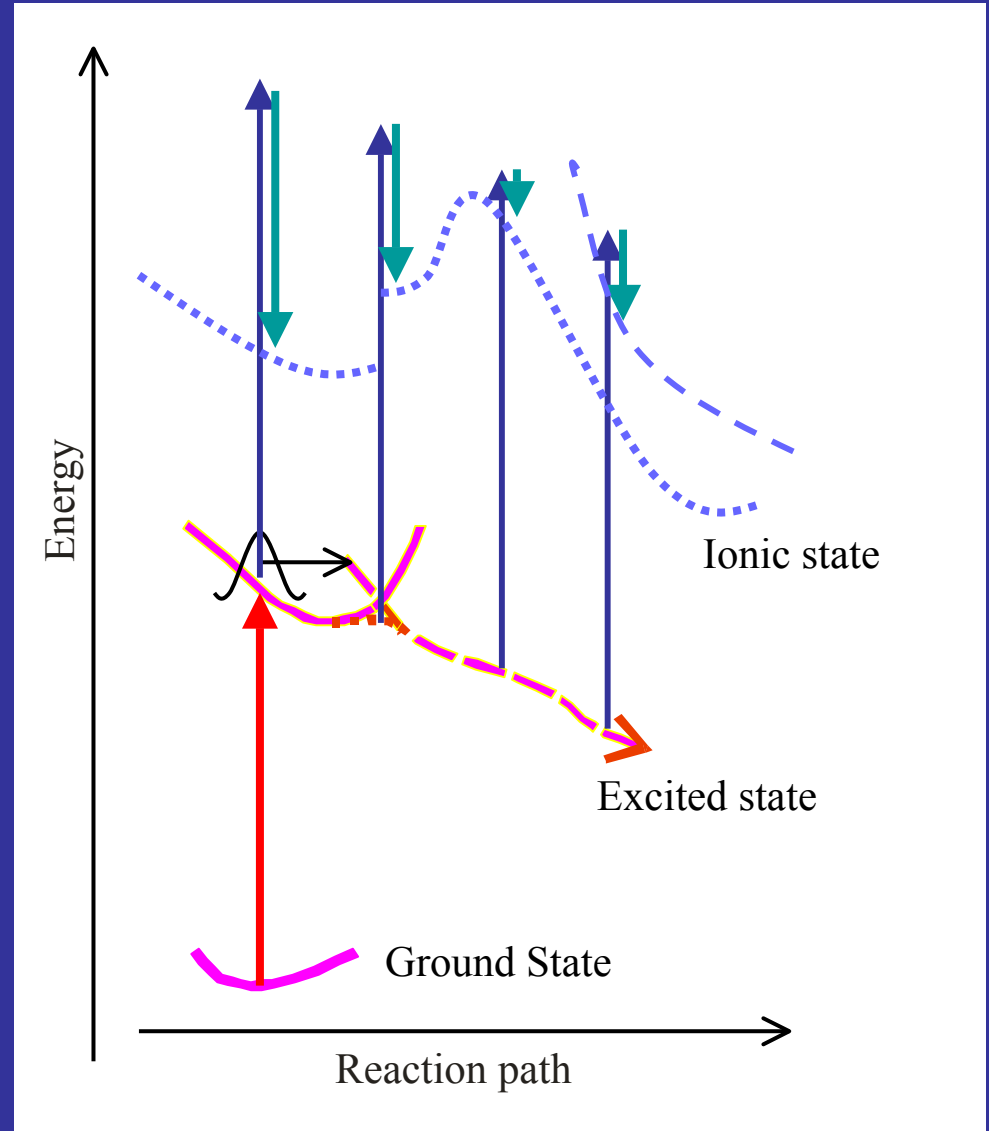
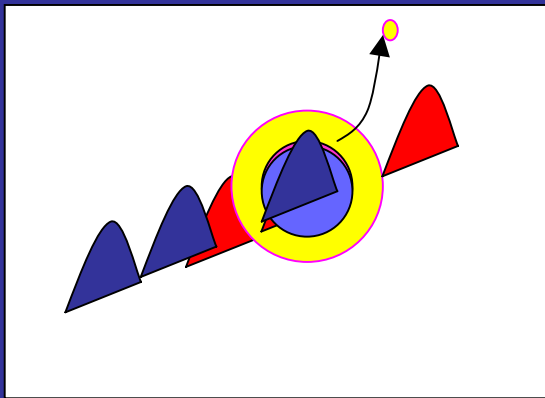
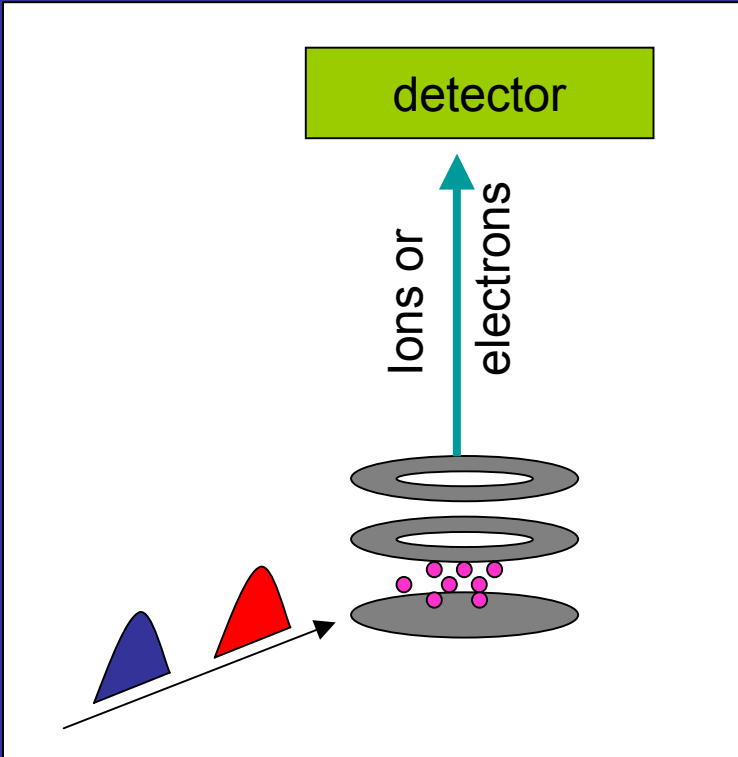
Guideline

→ Reaction dynamics at the 100 fs scale

→ Example studied in our lab

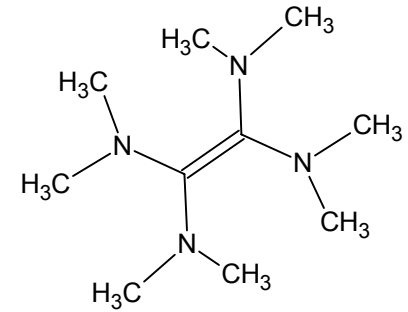
→ What we would like to do

Femtosecond Dynamics



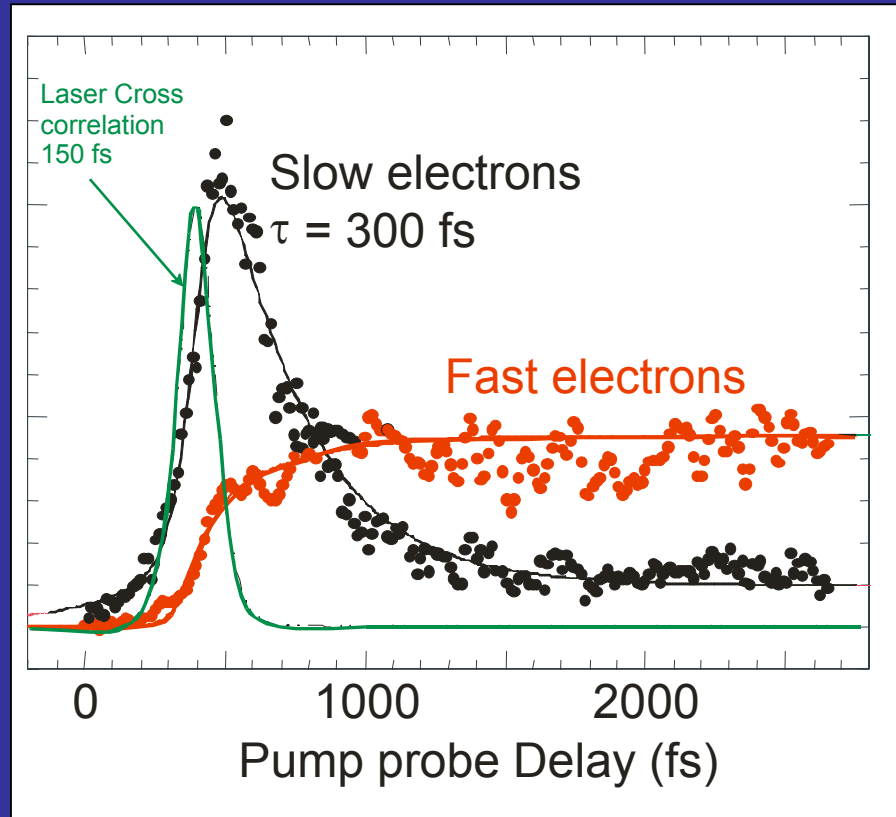
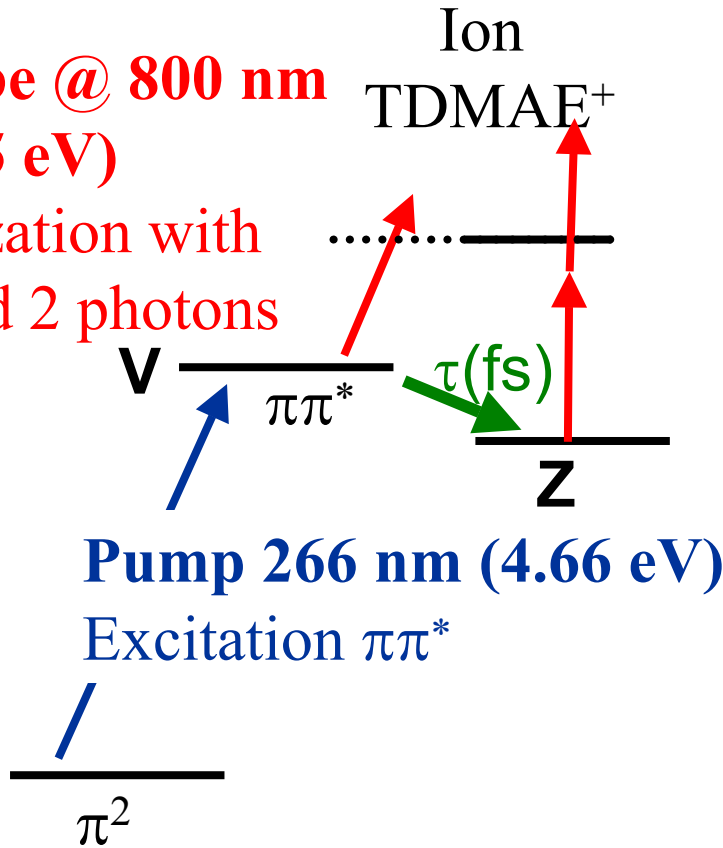
Dynamics of TDMAE

Ionization Potential = 5.36 eV

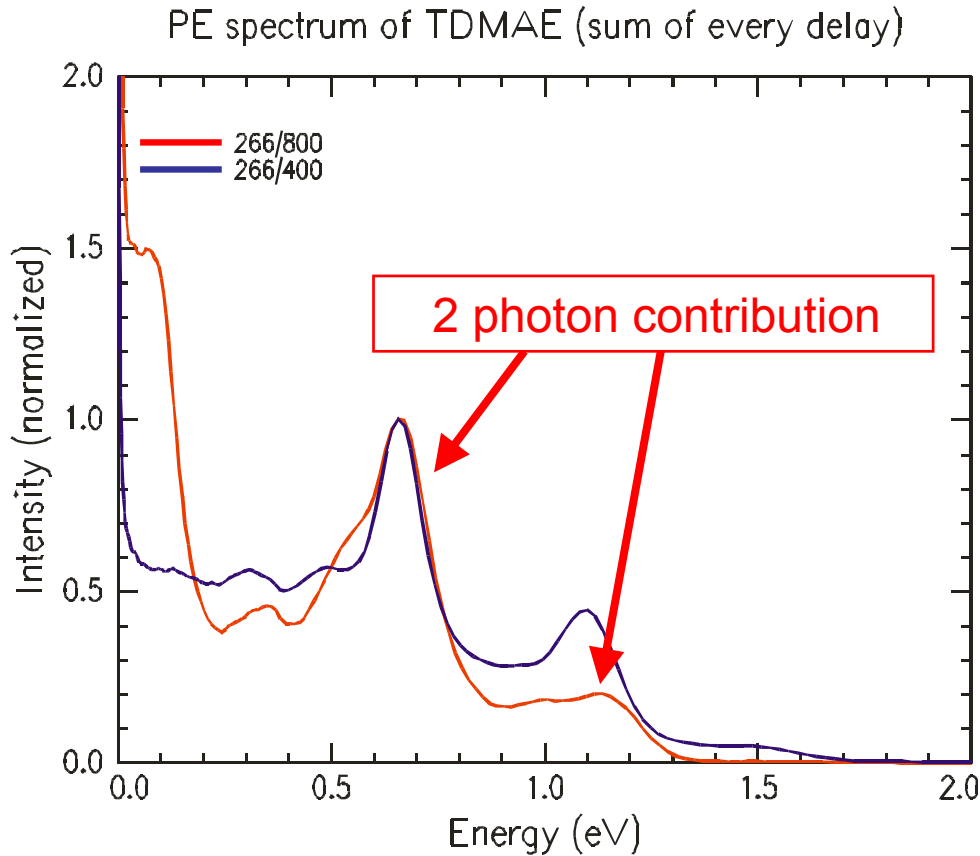


**Probe @ 800 nm
(1.55 eV)**

**Ionization with
1 and 2 photons**



Limitations for complex systems



Wavelength:

Too low = multiphoton

Not continuously tunable

Repetition rate :

OK for PE spectrums

but with high laser flux

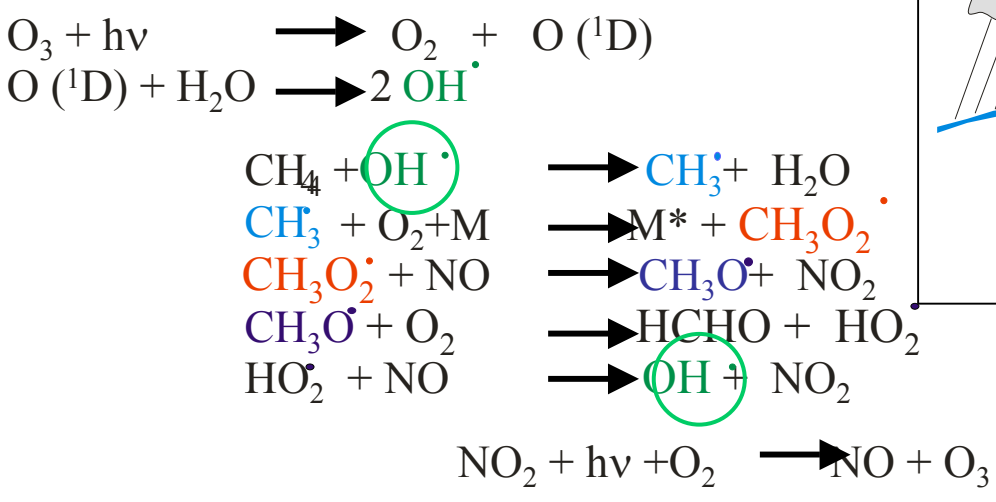
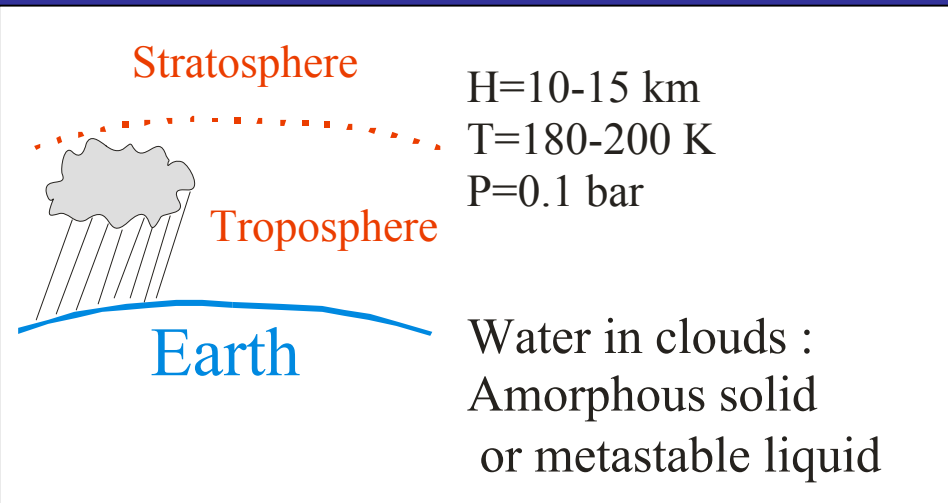
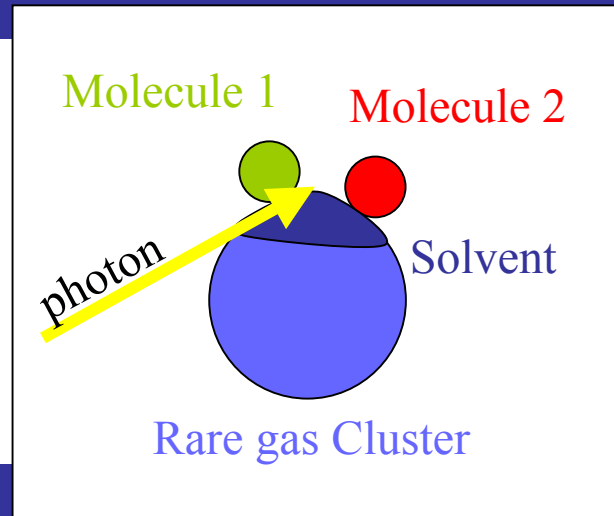
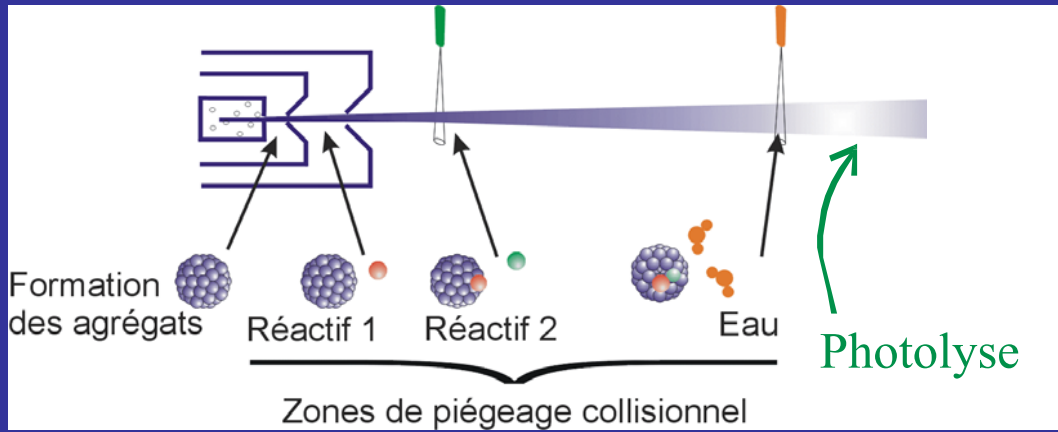
Too low for coincidences

Time resolution :

OK for small systems

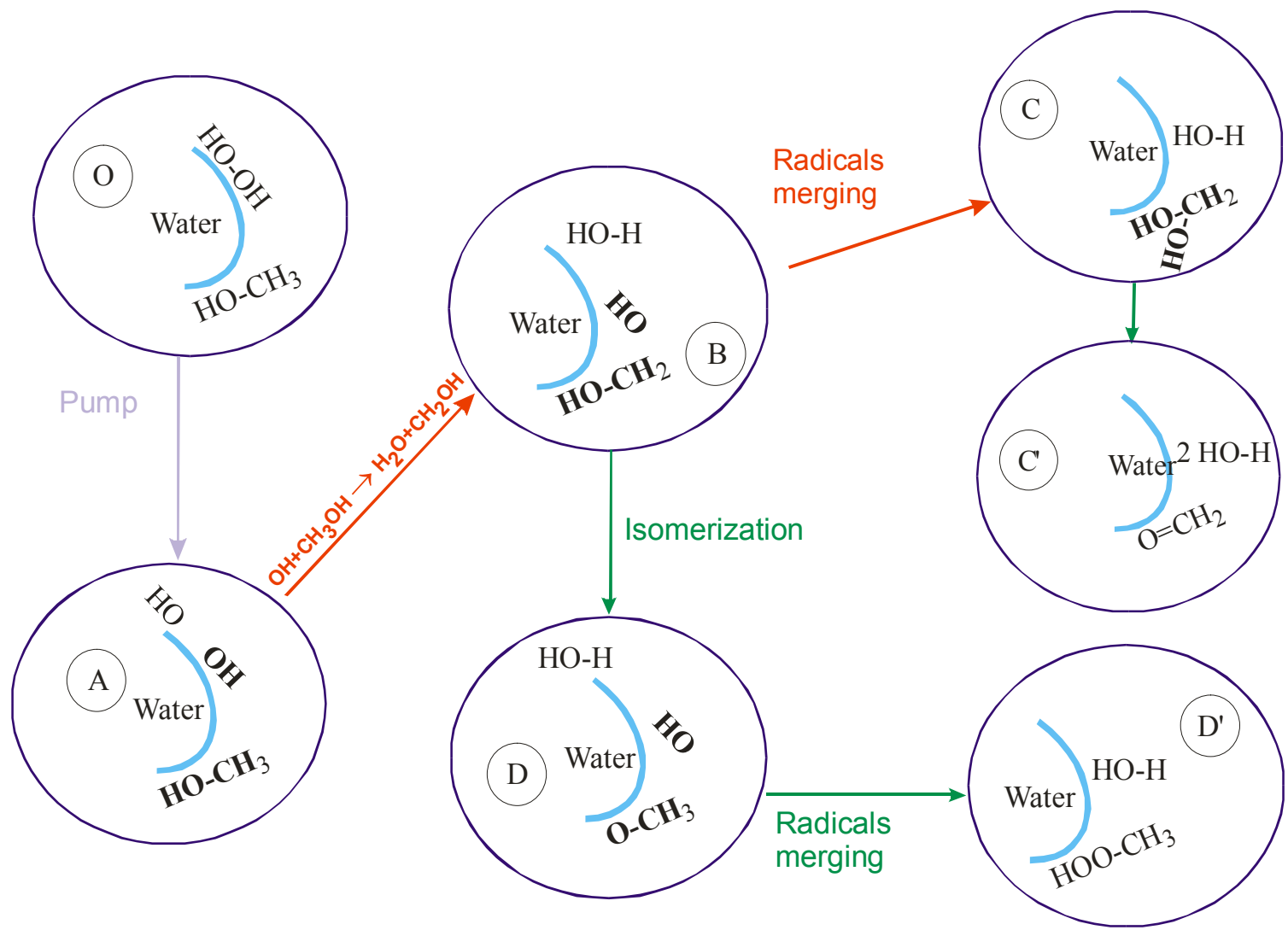
What could we do with ARC-EN-CIEL?

Study of chemical reactions deposited on cluster



Water in clouds :
Amorphous solid
or metastable liquid

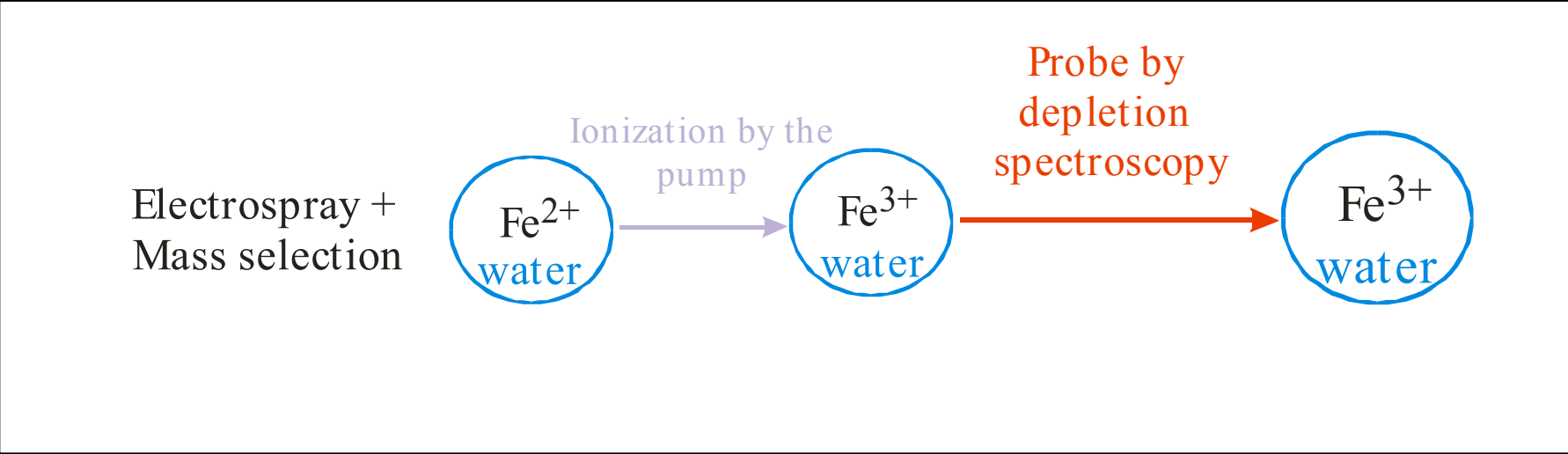
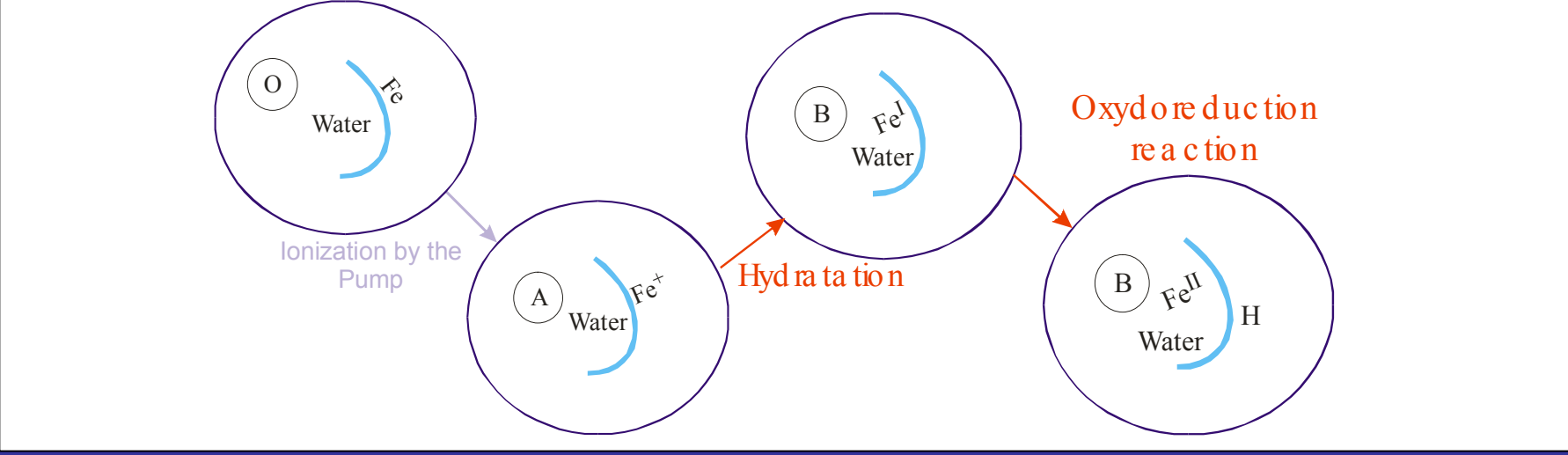
Study of chemical reactions deposited on cluster



Study of chemical reactions deposited on cluster

Other examples

Ion molecule reaction



Why ARC-EN-CIEL?

Optional ring = VUV Undulator & Free Electron Laser

Tunable wavelength visible to VUV for Pump & Probe	→	6 eV to 20 eV
Single photon absorption	→	10^{12} - 10^{13} ph/pulse
Time resolution (large systems)	→	200 fs
High repetition rate (coincidence technique)	→	> 30 kHz

Waiting for ARC-EN-CIEL...

Preliminary experiments with VUV harmonics in rare gas @ PELFA