

Le nucléaire au service  
de l'Homme

Centre  
d'Études  
Nucléaires  
de Bordeaux  
Gradignan



- **Exotic Nuclei**
- **Nuclear Excitations via Lasers**
- **Astroparticles**
- **Neutrinos- wine dating**
- **Interface  $\Phi$ -biology**
- **Nuclear Energy for the future**

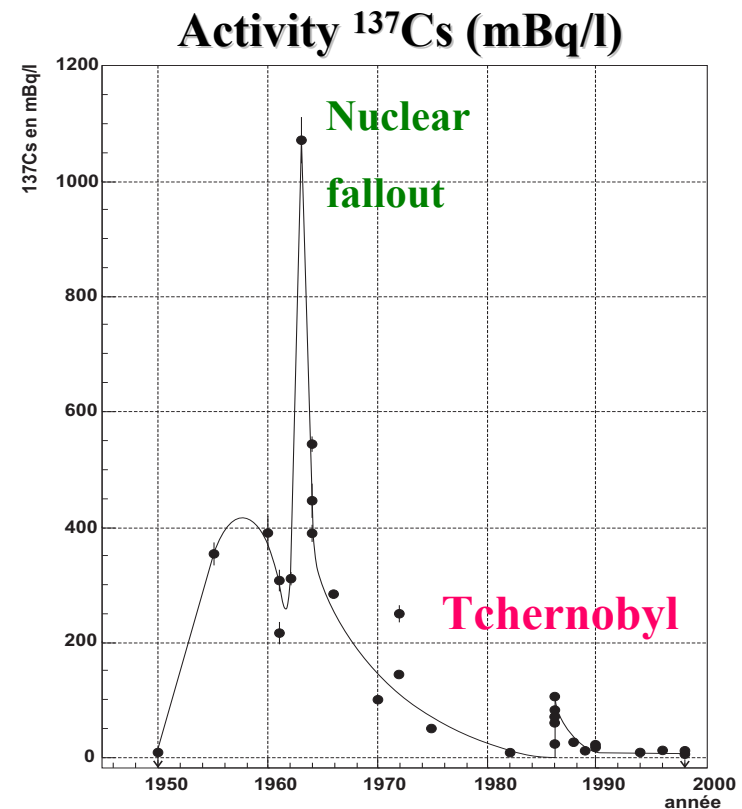
# From neutrino to wine...

To minimize the intrinsic radioactivity of the detector, all materials have been selected using **germanium photon detectors of very low level natural radioactivity**

*With such detectors : measurement of  $^{137}\text{Cs}$  in wine*



*Activity  $^{137}\text{Cs}$  → year*



# ***AIFIRA***

***Applications Interdisciplinaires des  
Faisceaux d'Ions  
en Région Aquitaine***

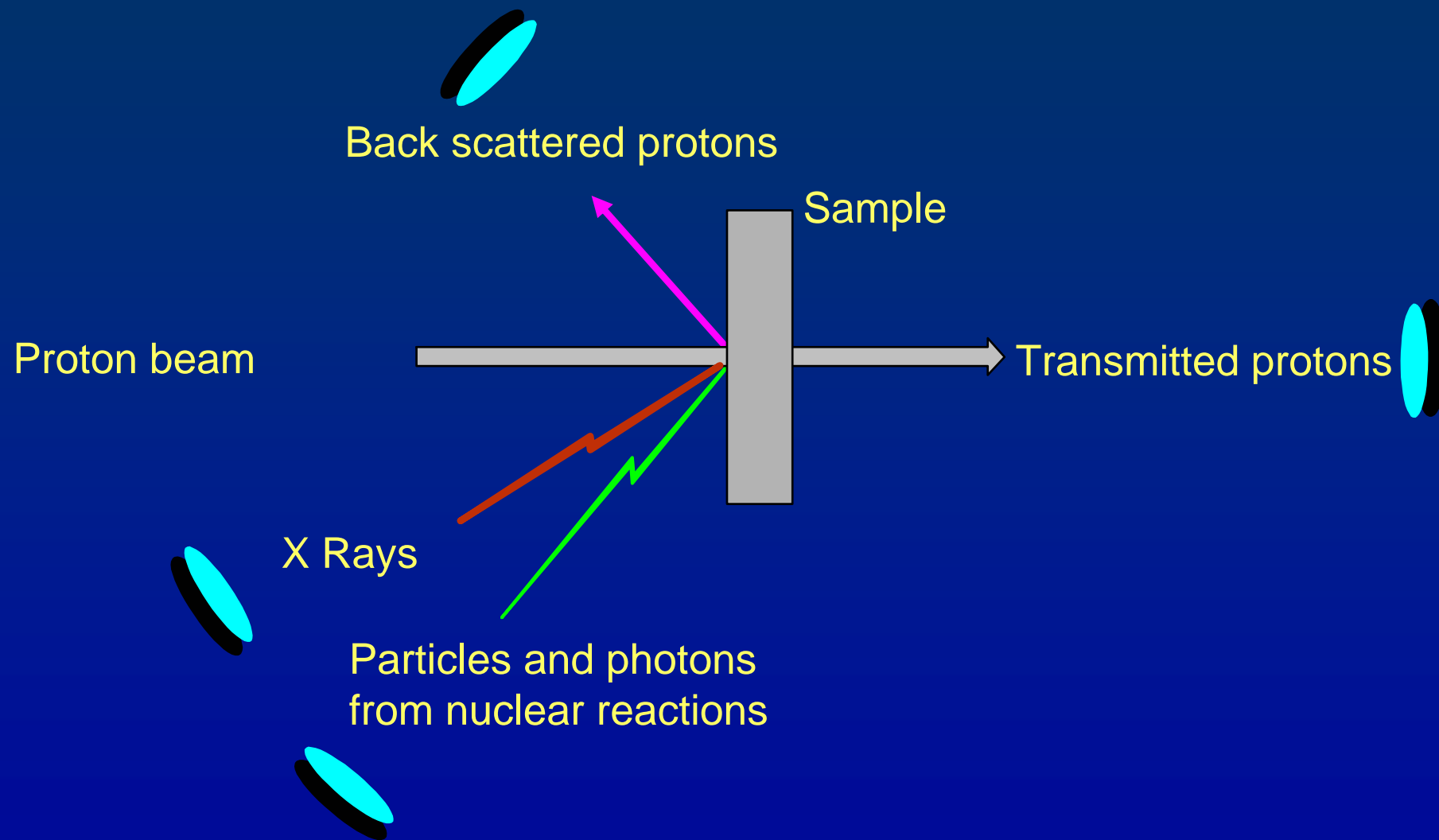
**HVEE 3.5 MV**  
**(High Voltage Engineering Europe)**

Light ions :H<sup>+</sup>,D<sup>+</sup>,He<sup>+</sup>

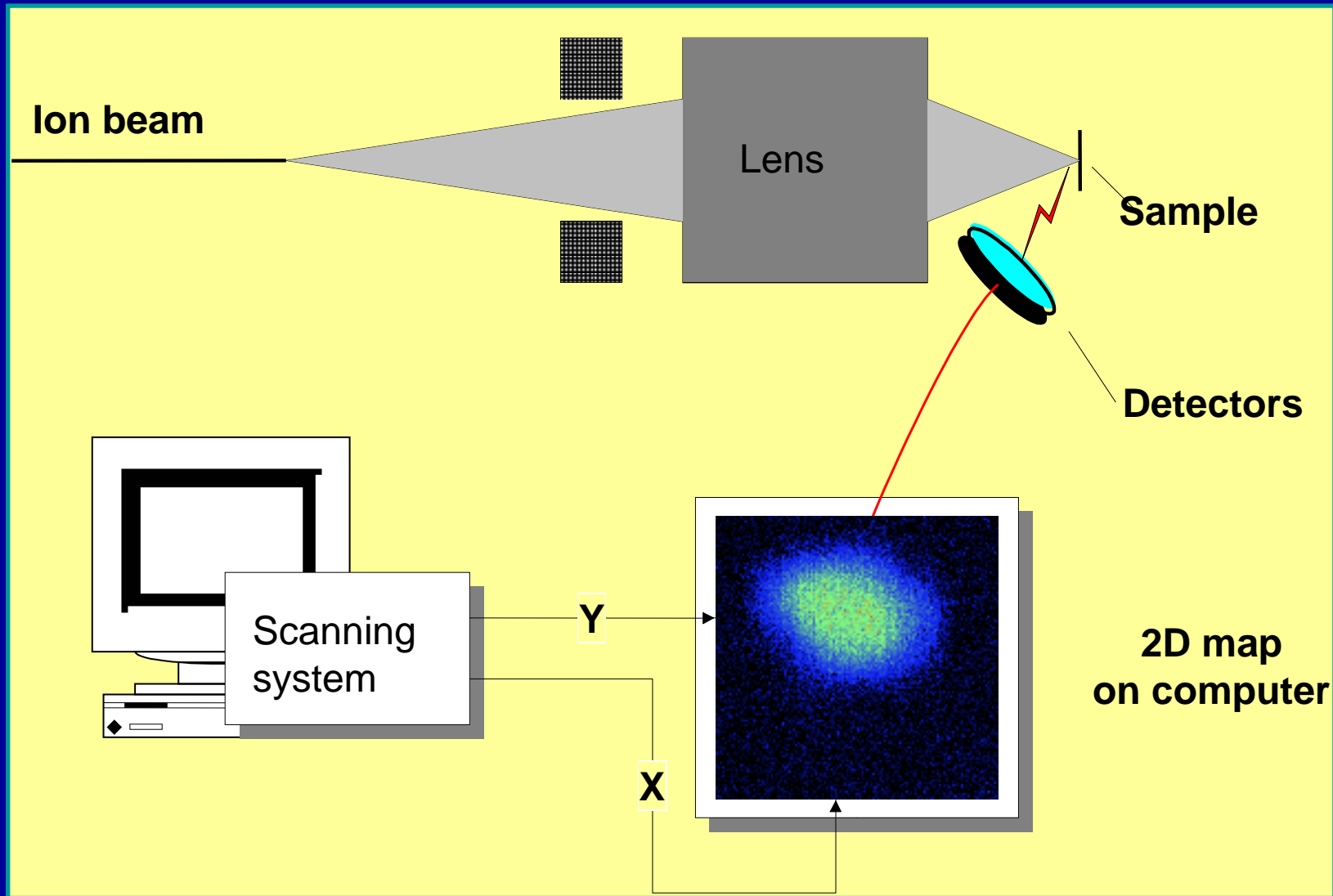
- Better energy resolution
- High brightness
- Better spatial resolution



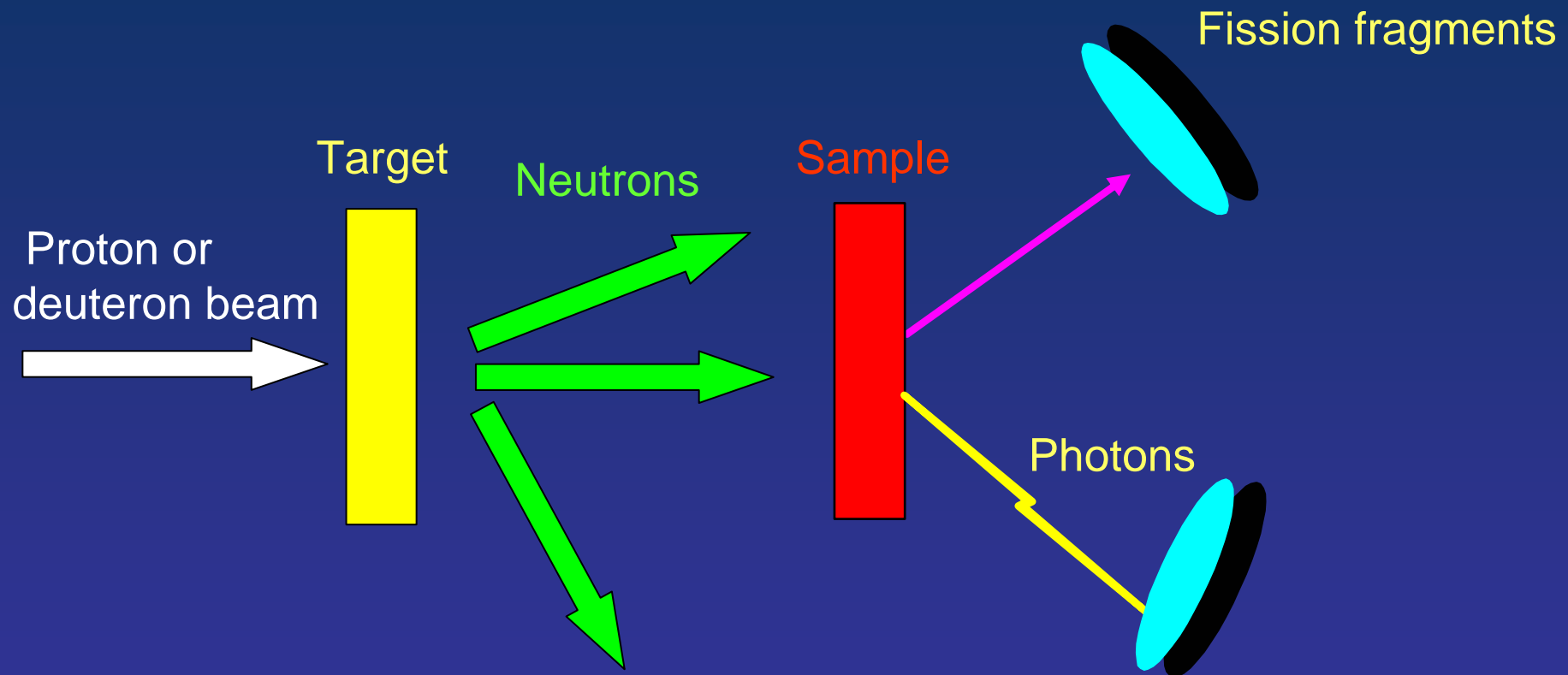
# Ion beam analysis



# Nuclear microscopy



# Monoenergetic neutron beams



$p + {}^7\text{Li}$   $\rightarrow$   $E_n \sim 0.1 - 0.5 \text{ MeV}$

$p + t$   $\rightarrow$   $E_n \sim 0.5 - 2.0 \text{ MeV}$

$d + d$   $\rightarrow$   $E_n \sim 2.0 - 6.5 \text{ MeV}$

$\phi \sim 10^6 \text{ n/s.cm}^2$





With this new accelerator

- Intense low energy ion beams ( 0.5 to 3.5 MeV )
- Spatial resolutions from a few mm to  $\approx$  50 nanometers



Unique plateforme in France

for ion beam analysis and characterization techniques in:

- ✓ Environment
- ✓ Radiobiology, Dermatology, Pharmacology
- ✓ New materials
- ✓ Archaeometry
- ✓ Micro-electronics
- ✓ Nuclear waste transmutation, New fuel cycles