



MIMAC-FASTn : A directional fast neutron spectrometer [10 keV - 600 MeV]

Journée Partenariat Labex PRIMES

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RADIOTHERAPIES : FAST NEUTRON MONITORING

- Standard X-ray therapy
- Hadrontherapy
- BNCT

Neutrons are produced

Emitter
localization?

What energy ?

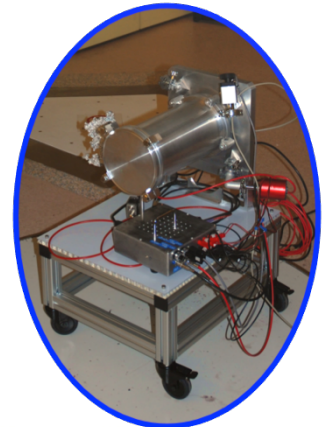
What dose ?

What angular
distribution ?

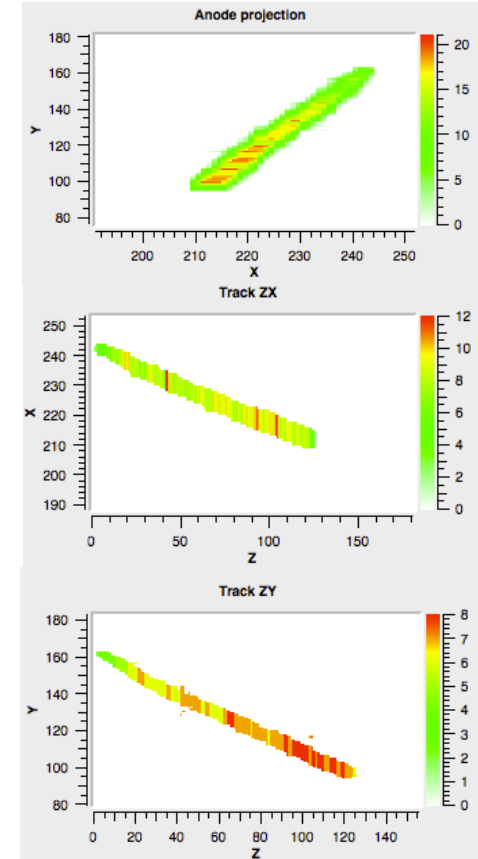
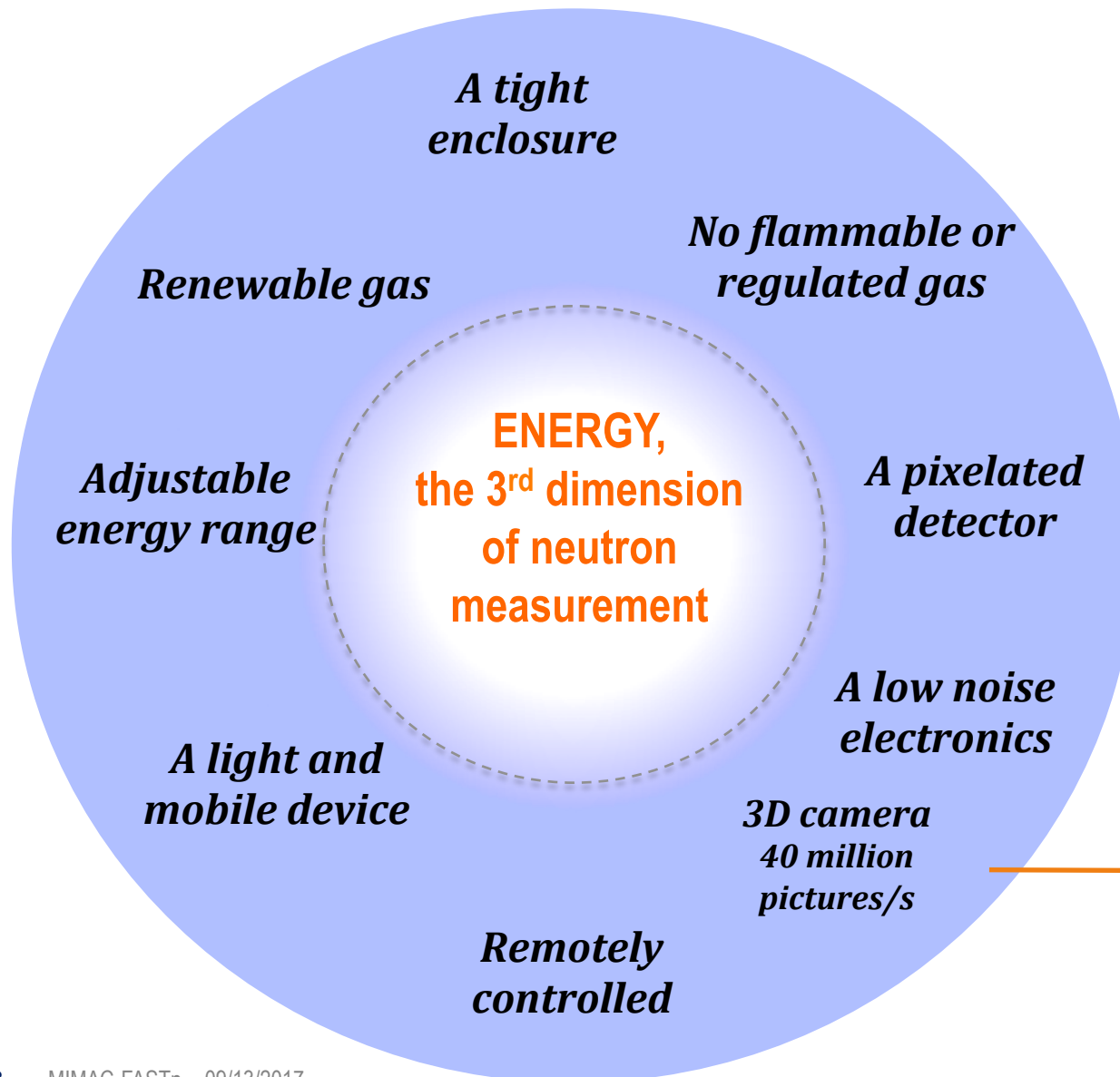
MIMAC-FAST_n
is the tool for neutron monitoring!

A fast neutron spectrometer
on a compact mobile cart :

- In a few minutes :
Detection of thermal and fast neutrons
Detection of gamma rays
with excellent discrimination from neutron signal
- Neutron energy determination
in the range **[10 keV ; 600 MeV]**
- Localization of fast neutron source



MIMAC-FASTn specificities

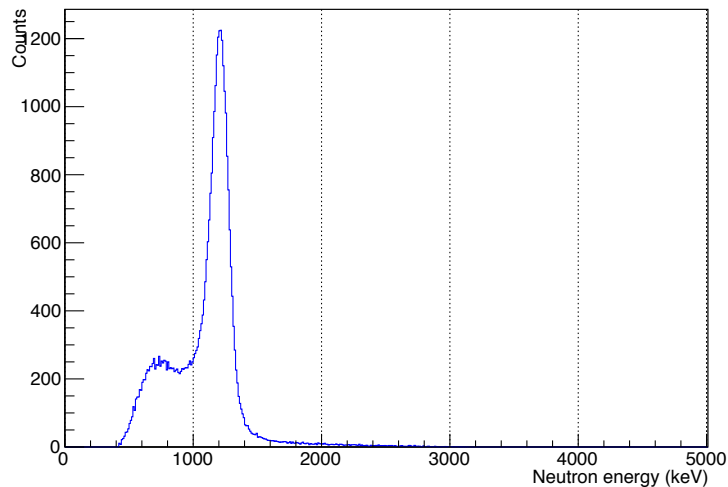


Visualization of the neutron interactions with the gas nuclei

Some spectrometry results

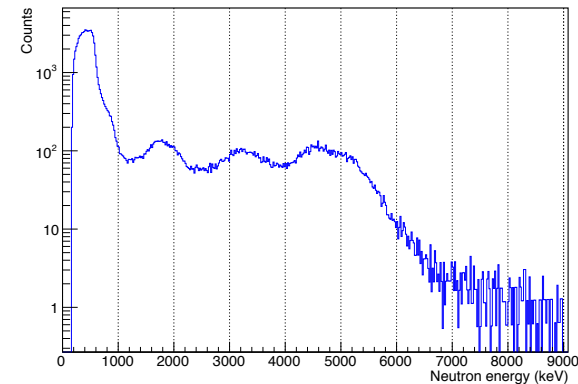
Mono-energetic measurement for
 $T(p(2\text{ MeV}), n)$: neutrons of 1.2 MeV

Measured neutron spectrum :

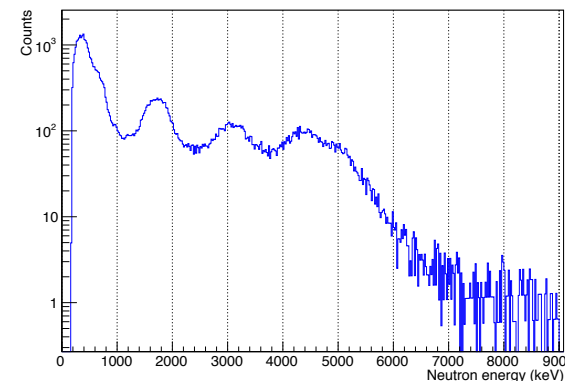


Angular distribution for
 ${}^9\text{Be}(d(1,45\text{ MeV}), n)$

Measured neutron spectrum at **0 deg**



Measured neutron spectrum at **60 deg**



PROJECT CURRENT STATUS

A valorization project :

- « Maturation » funded by **SATT Linksium**, for a possible future industrialization
- A new demonstrator for June, 2018

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