

# Gamma-MRI

## A radically innovative Biomedical Imaging Technology



FET Open 964644

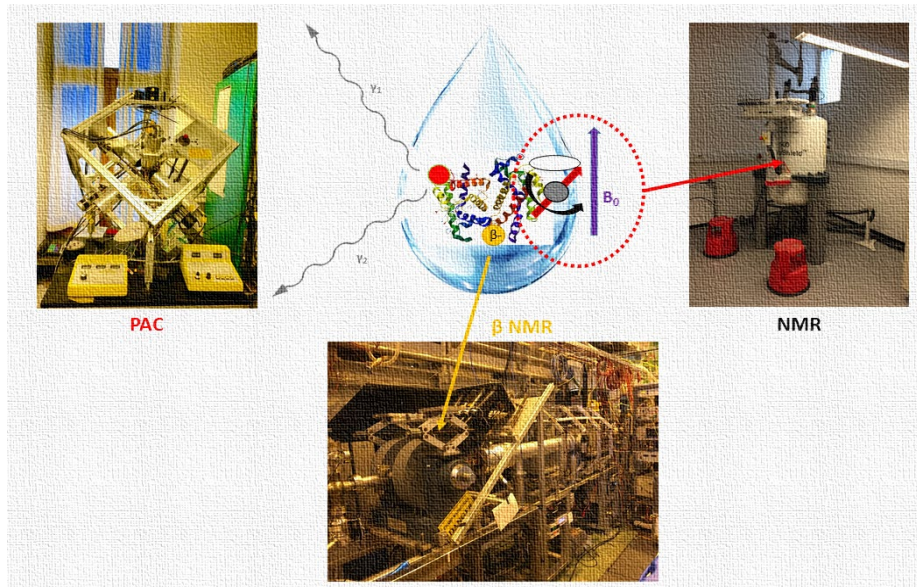
Lina Pallada, PhD  
Assistant Professor HES

# How the idea of Gamma-MRI was born?

2017

PhD thesis:

Nuclear Spectroscopic Techniques for studying biological systems

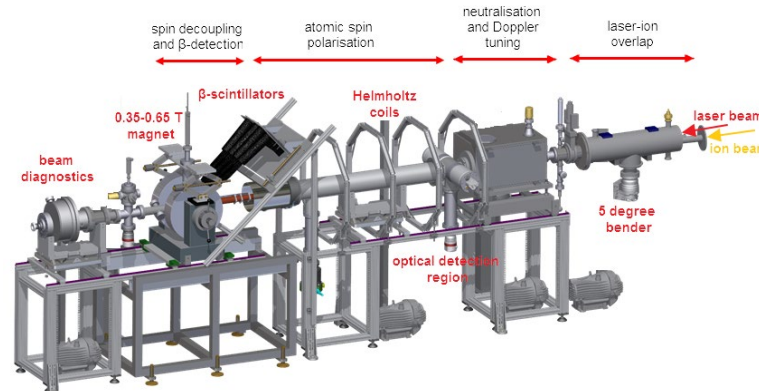


## Facility of radioactivity production

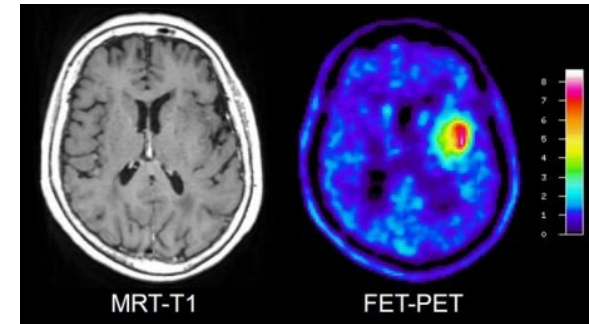


# How the idea of Gamma-MRI was born?

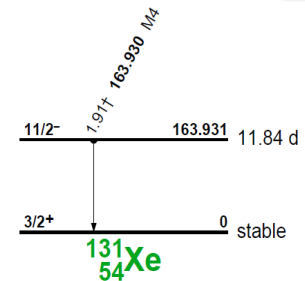
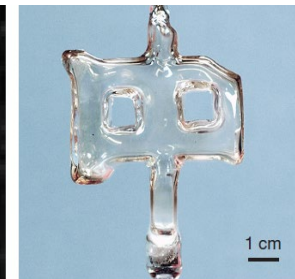
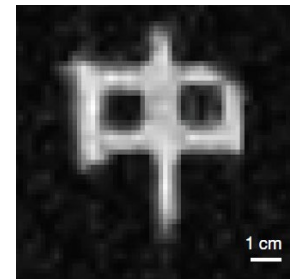
We had the  
“Know-how”



We had the medical  
applications interest

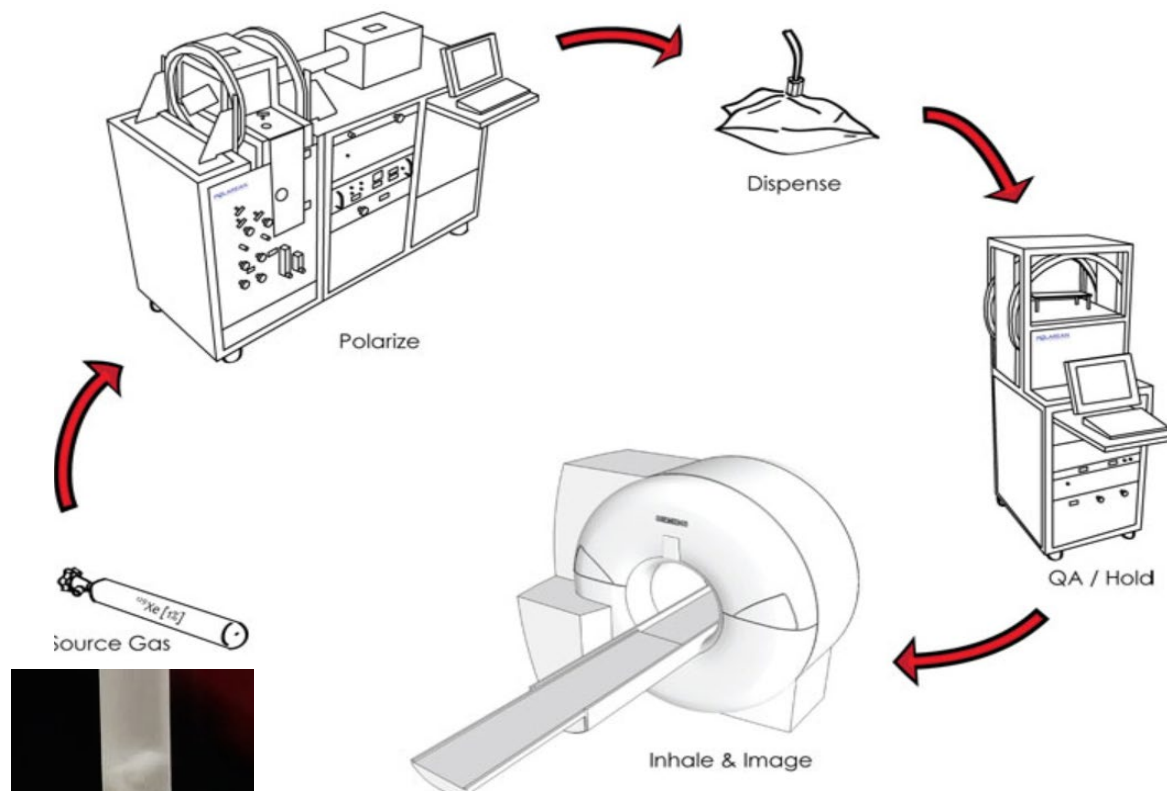


And one day we saw  
the Nature publication!

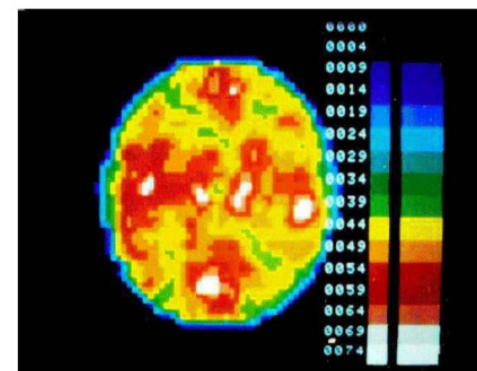


# The proposed new modality: Gamma-MRI

Spin Exchange Optical Pumping  
with laser polarised Rb setup



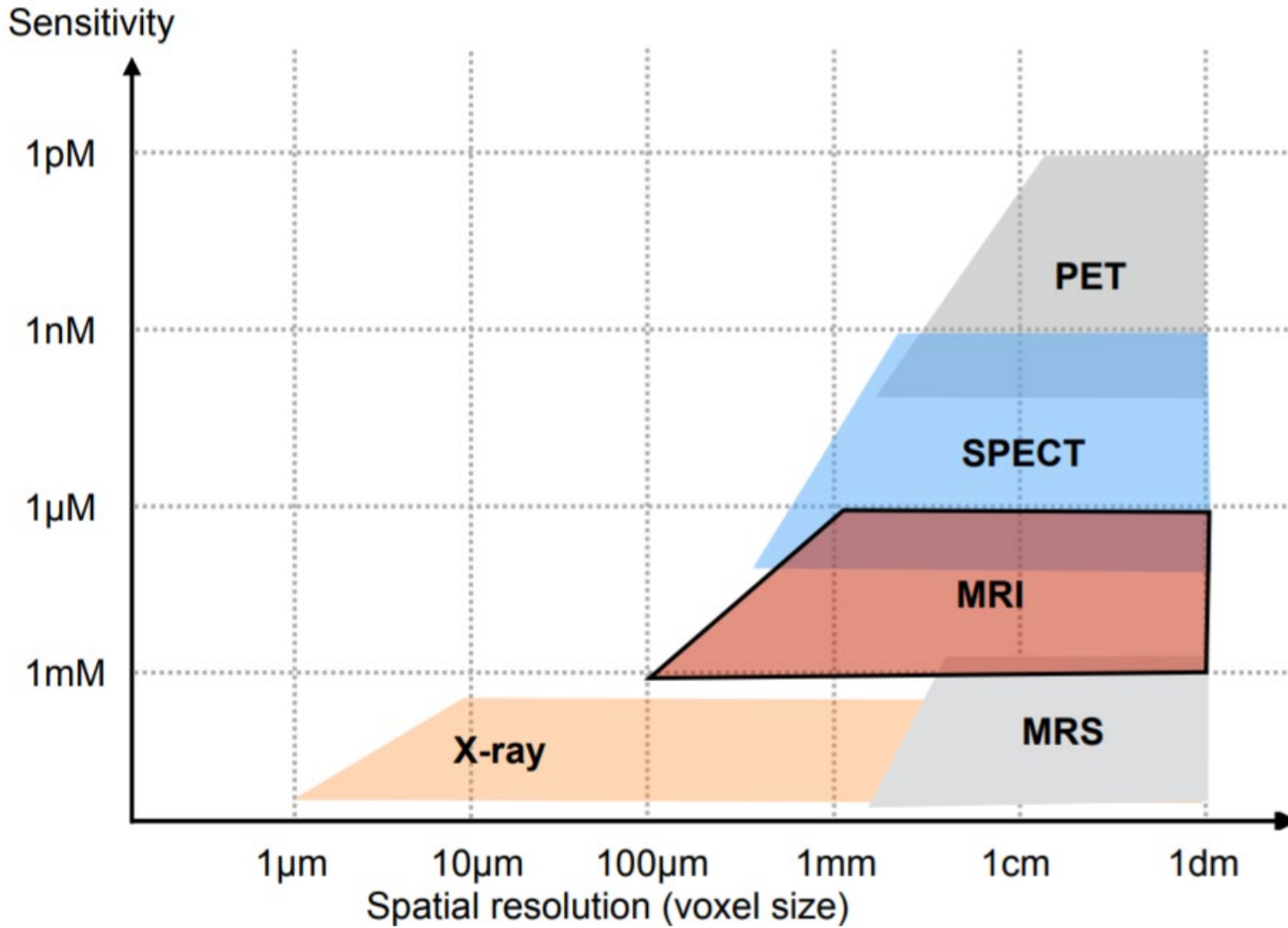
HP Xe SPECT image



133Xe SPECT

Radioactive mXe isotopes

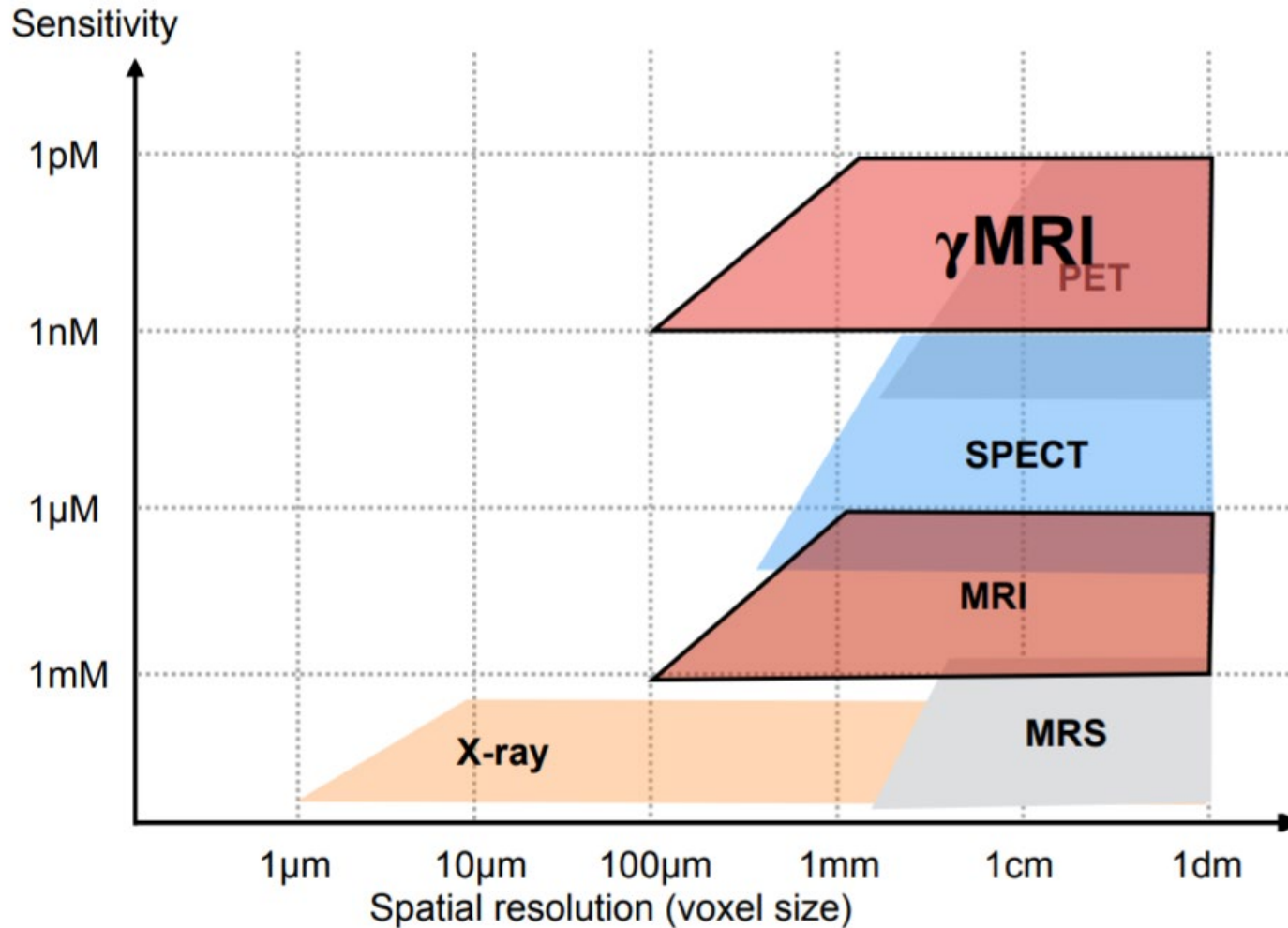
# Existing modalities





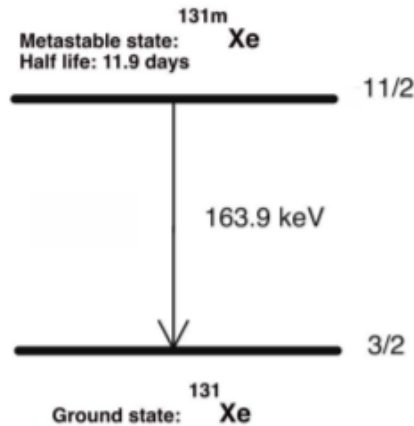
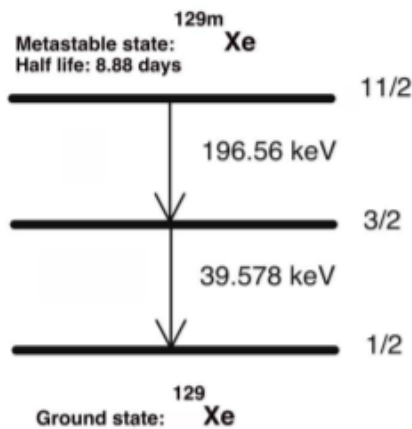
# Gamma-MRI

Versatility and resolution of MRI and Sensitivity of PET with lower patient doses and simpler hardware

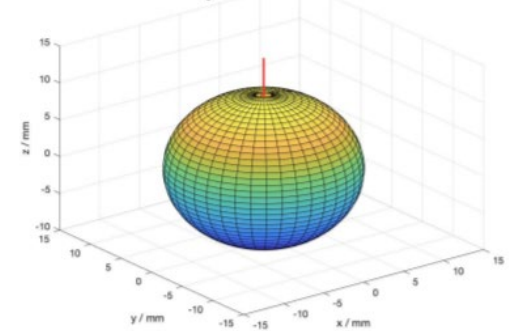


# Gamma-MRI principle

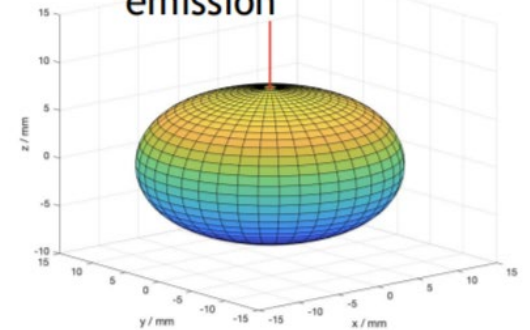
Excited radioactive isotopes decay through  $\gamma$  (here  $^{129m}\text{Xe}$  and  $^{131m}\text{Xe}$ )



Isotropic emission



Anisotropic emission



When hyperpolarised through optical pumping (SEOP) in a magnetic field  $\rightarrow$  anisotropic emission

# Current status

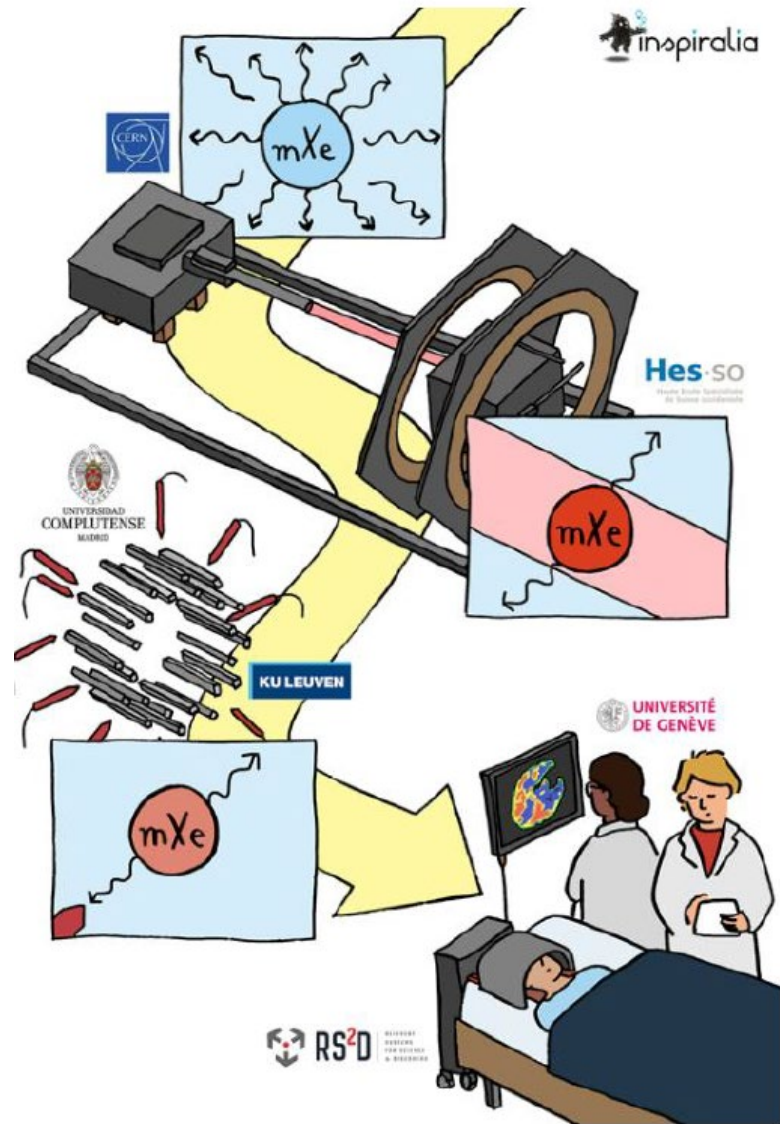


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FET Open- Novel ideas for  
radically new technologies

HES-SO: Coordinator

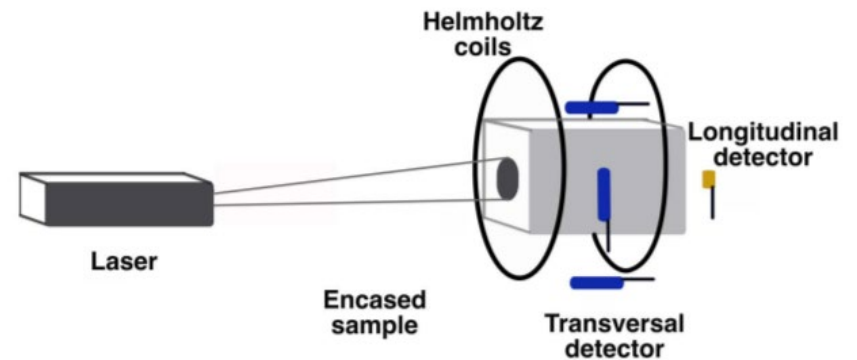
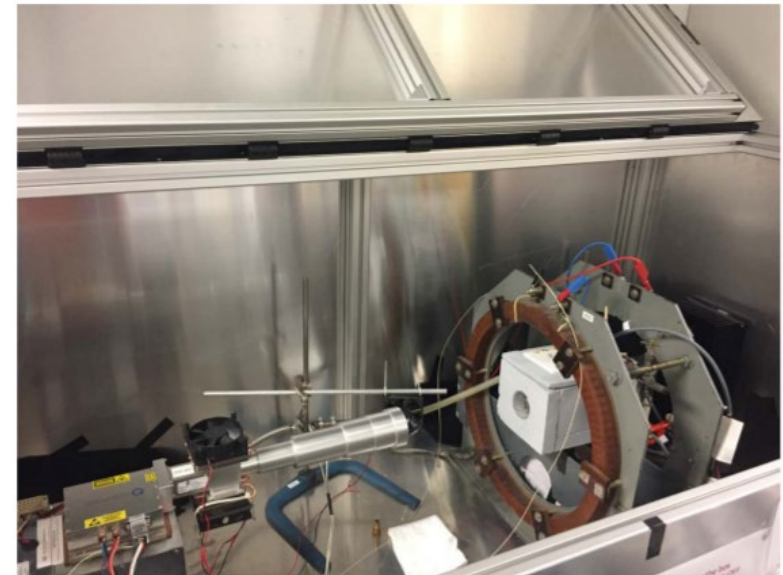
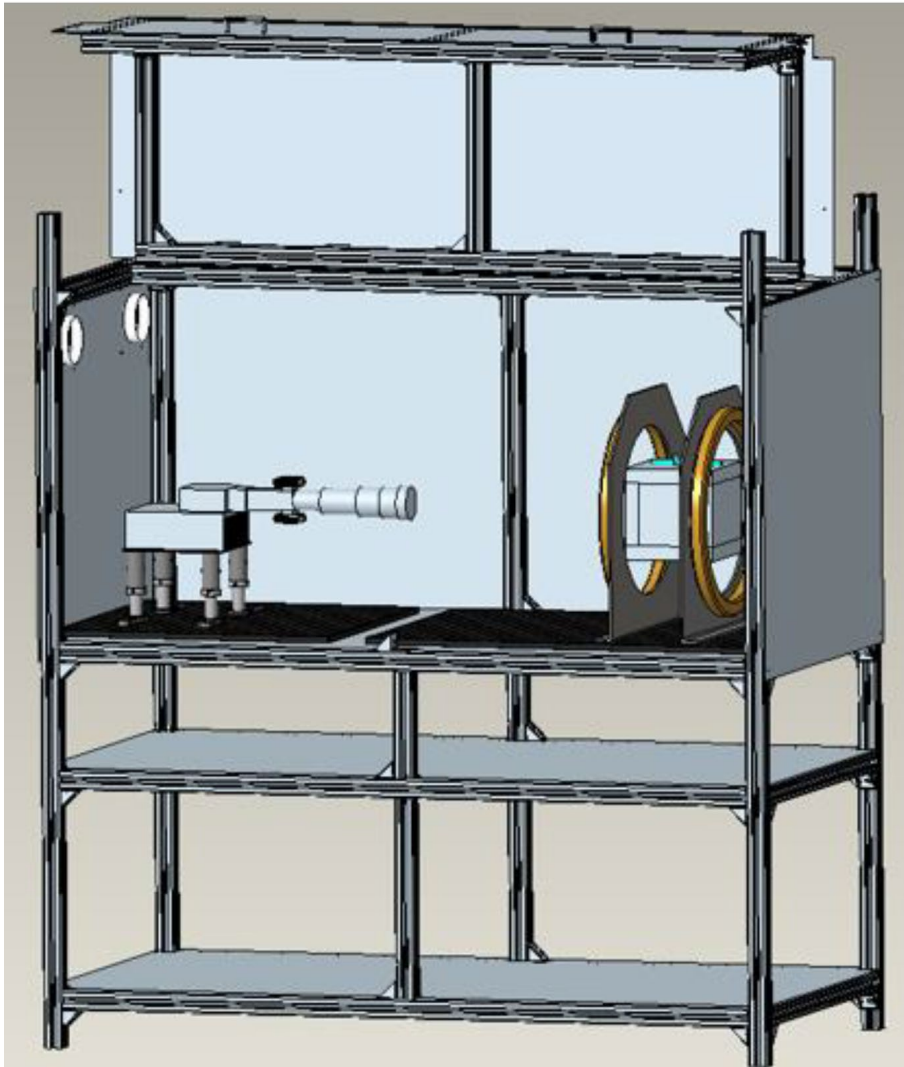
Start date: April 2021





# Current status

First SEOP tests at HES-SO with stable and soon radioactive Xe samples



# Acknowledgements



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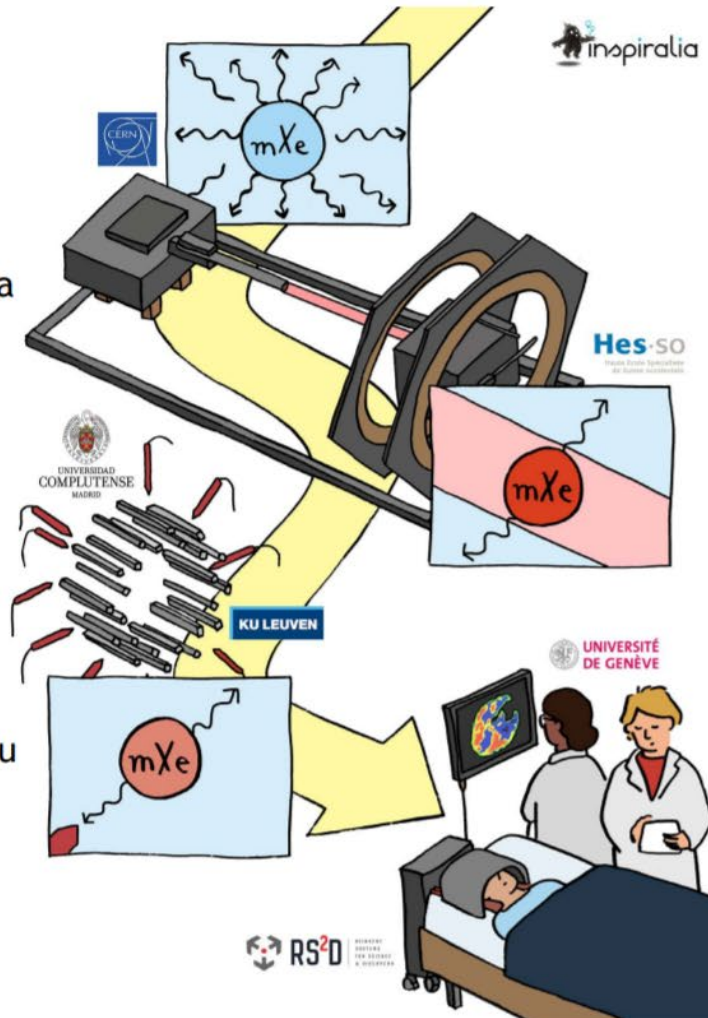
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