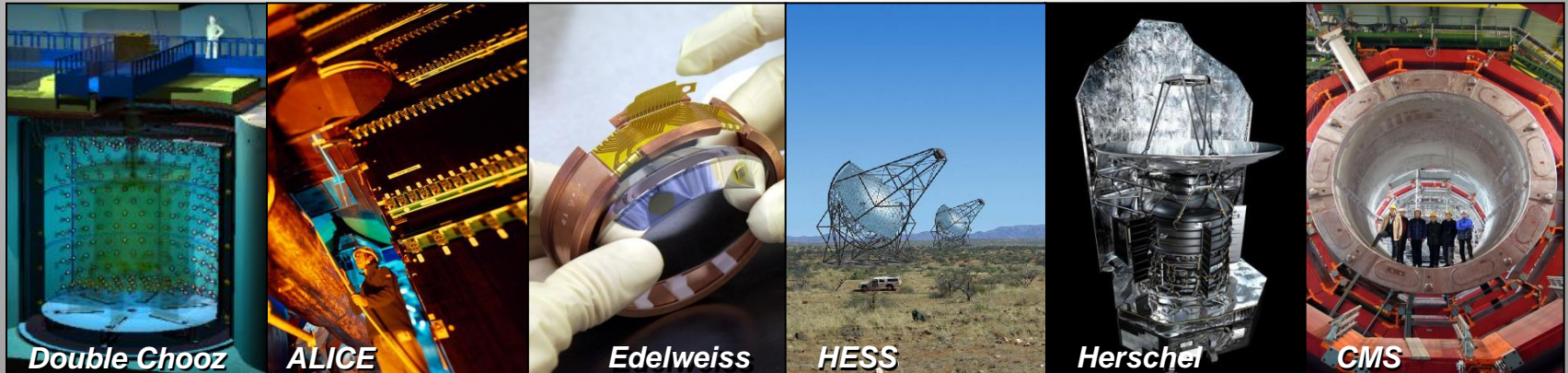


Institute of Research into the Fundamental laws of the Universe

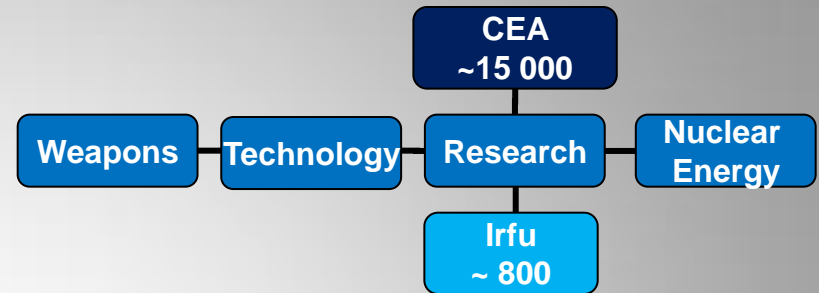
Nicolas ALAMANOS

Deputy director of the Institute

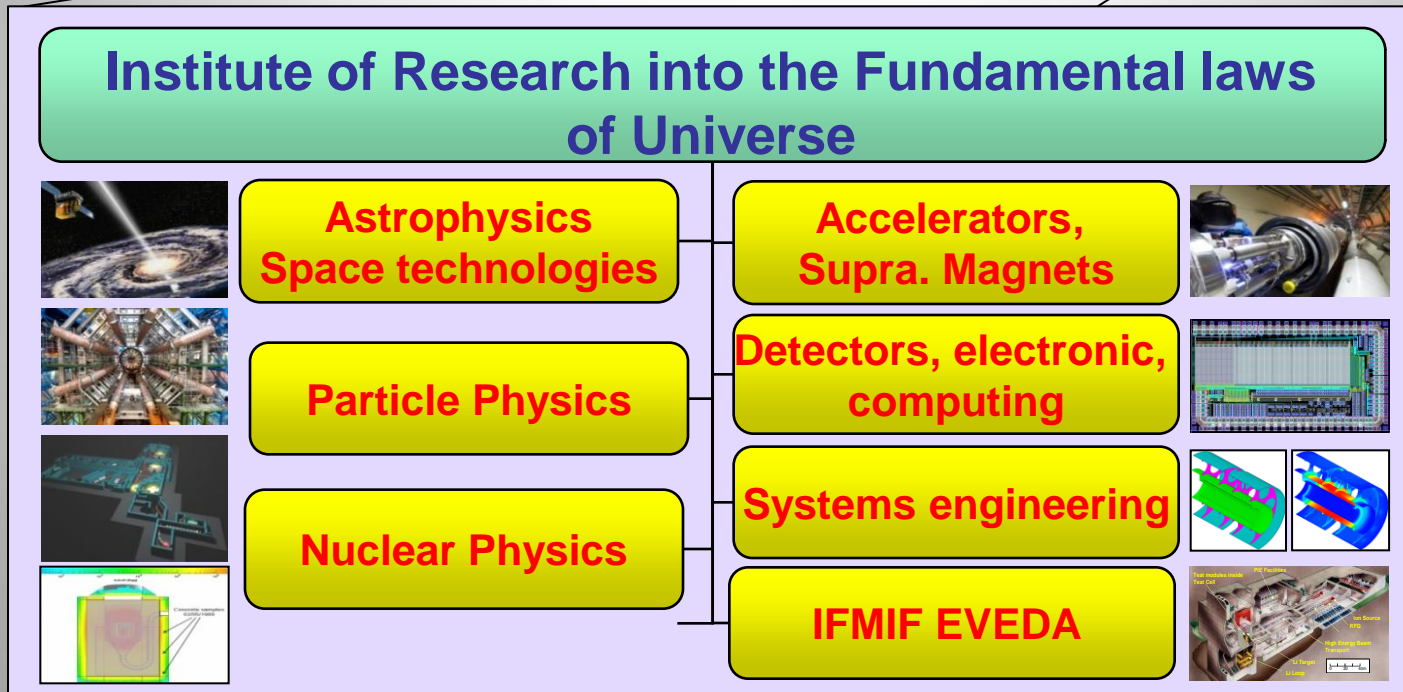
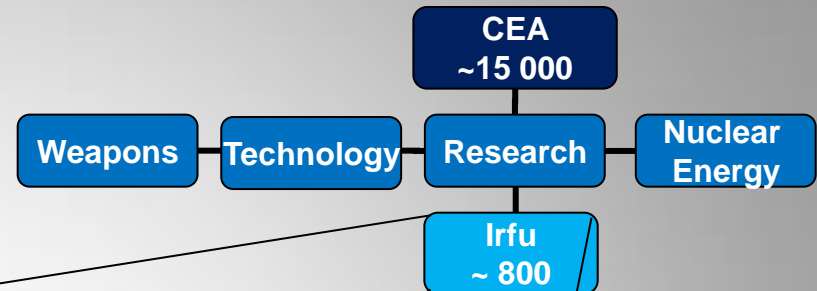


Detecting radiations from the Universe.

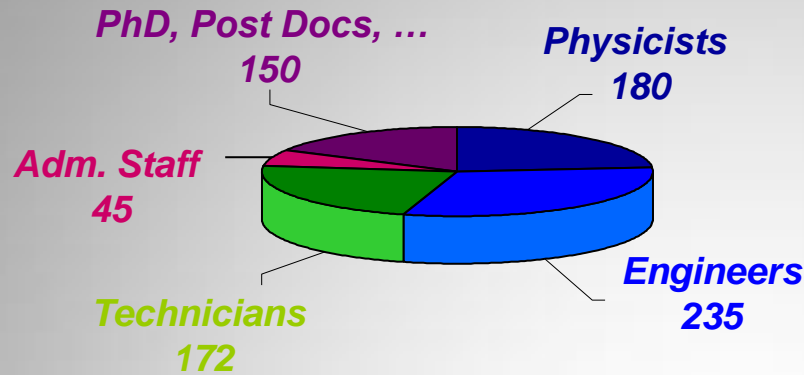
The larger institute of CEA



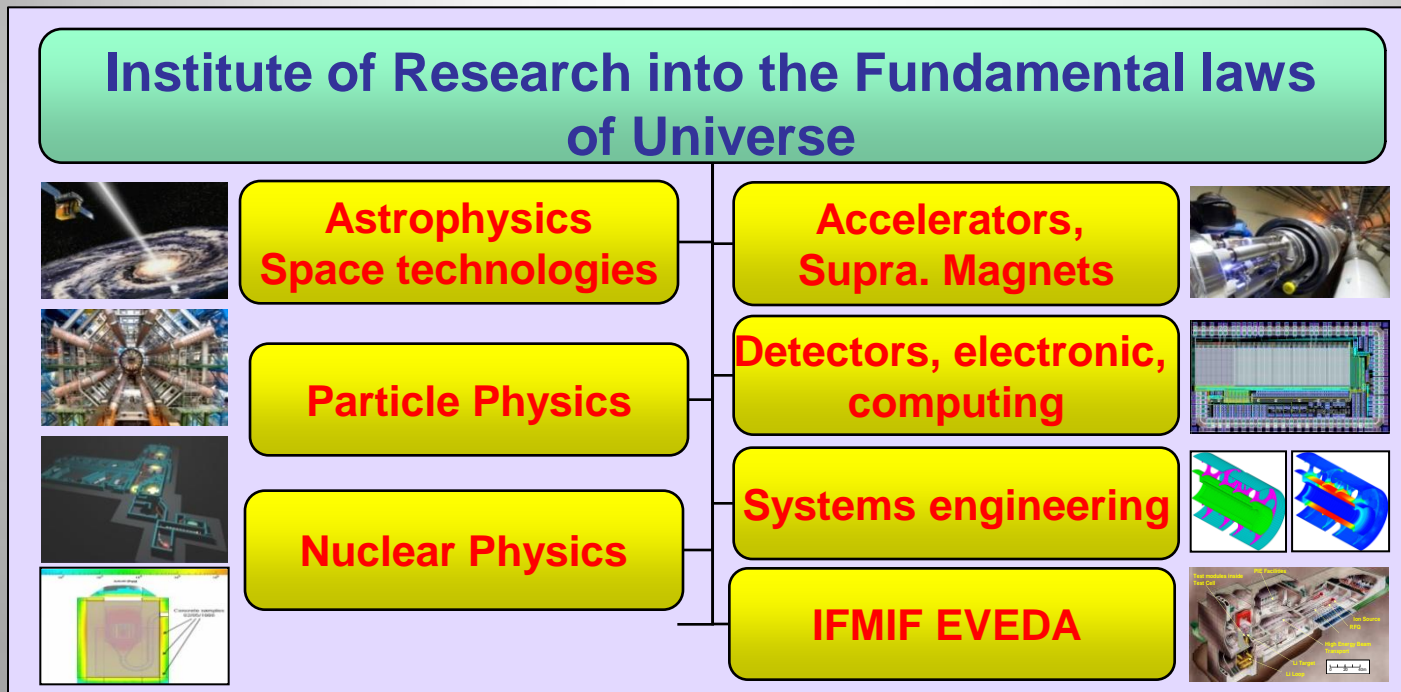
The larger institute of CEA : Research and technology



The larger institute of CEA



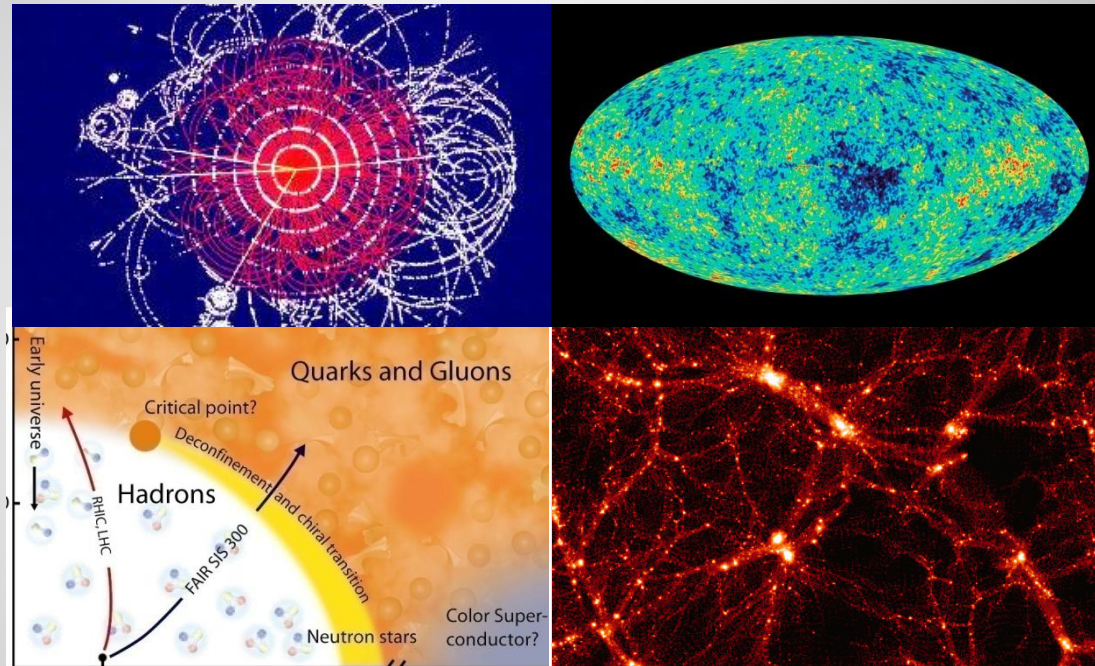
Research and technology



CEA - Irfu:4 fundamental questions

What are the ultimate constituents of matter ?

What is the energy content of the Universe ?



What are the properties of matter under extreme conditions ?

What is the origin and structure of Universe ?

I. Discovering the fundamental laws of Universe

1. Elementary constituents ?

- Standard Model, Higgs boson (D0, ATLAS, CMS)
- Neutrinos oscillations (T2K, Double-Chooz)
- Structure of Hadrons (COMPASS, JLAB)

2. Energy content ?

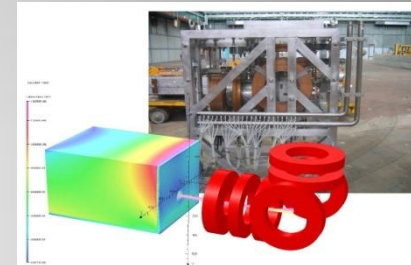
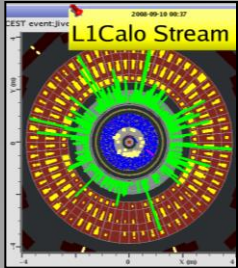
- Dark Universe (Edelweiss, BAO, Euclid ...)
- Antimatter (Babar, Gbar)

3. Structures in the Universe ?

- Cosmology (Horizon, Planck)
- Formation of galaxies and stars (Herschel, JWST ...)
- Cosmic radiations (Fermi, SVOM, HESS, Antares)

4. Matter under extreme conditions?

- Plasma of quarks and gluons (ALICE)
- Exotic nuclei (GANIL/SPIRAL2, FAIR)



II. Inventing and constructing new devices

1. Production and manipulation of radiations

- Accelerators (Spiral2, XFeL, FAIR, CERN, IFMIF, ESS)
- Magnets and Superconductivity (R3B, ISEULT)

2. Detecting radiation

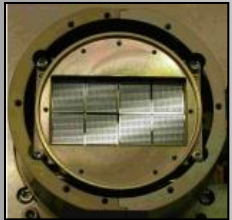
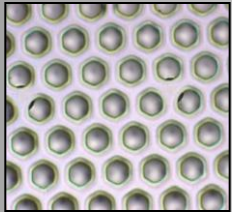
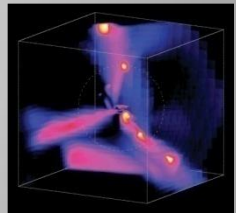
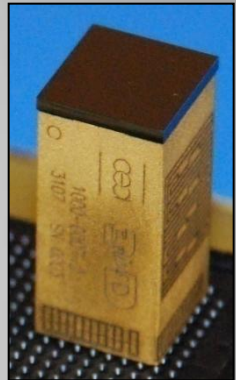
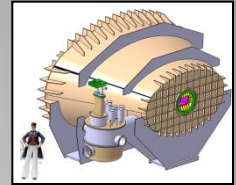
- Microstructured detectors (RD51)
- Imaging device (ELT-METIS, APEX, CALIST)
- ASIC

3. Space technology

- Camera (PACS, MIRI, Éclair)
- Data center (Fermi, SVOM)

4. Simulation and data treatment

- Massively parallel calculations
- Grid
- Data processing

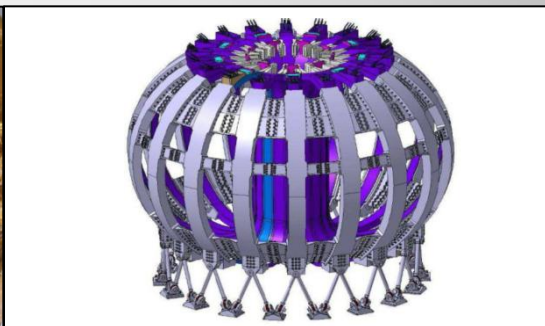


III. Applying research and technologies

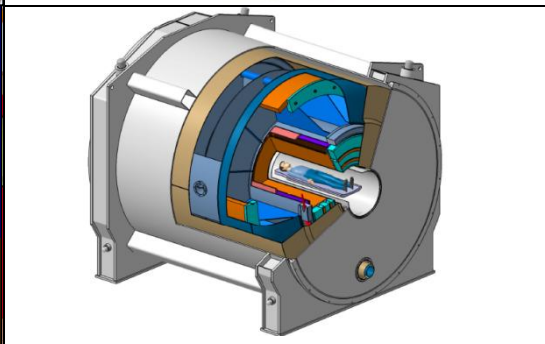
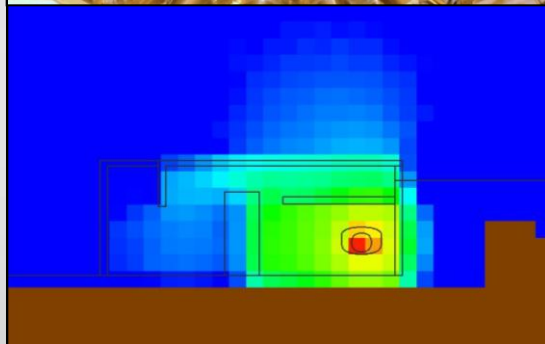
knowledge

Know-How

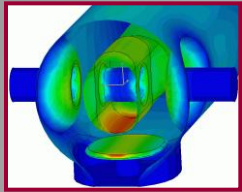
Energy



TGIR

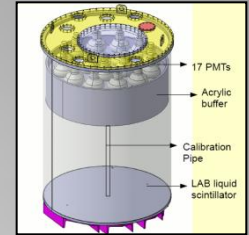


III. Applying research and technologies



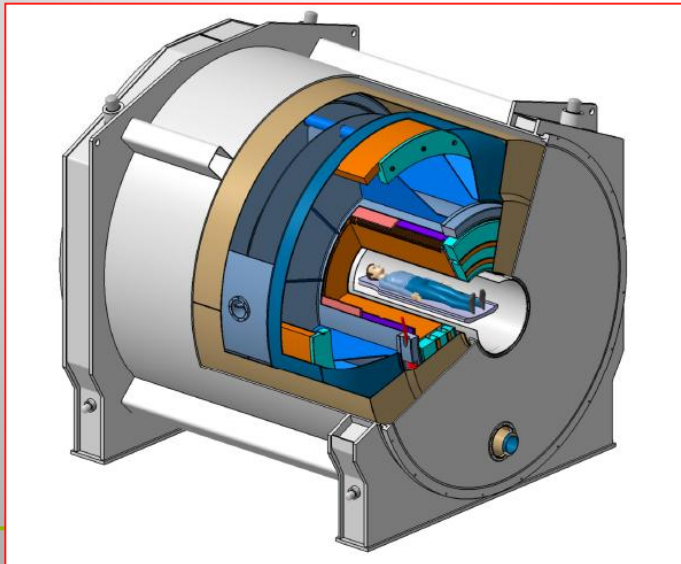
1. Nuclear energy

- Nuclear data and techniques (Nucifer)
- Fusion & Broader approach (IFMIF-EVEDA, JT60Sa, W7x)



2. Application for society

- Material science (XFEL, ESS)
- Application to life science (ISEULT)



Strong international collaborations

Research projects inside large international programs
implying a collaboration with other French and foreign institutions



Feuille de route TGI

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Energy content	Dark Energy				EUCLID	esa cnes					
	Dark Matter		EDELWEISS	ANR	FP7		ULYSSE			EURECA	
	Cosmology		PLANCK	esa cnes			BAO				
Structure Formation	Larges structures	JWST-MIRI	esa cnes			MIRI EXPERTISE CENTER		ELT-METIS	ESFRI		
	Stars	HERSCHEL	esa cnes			ICC HERSCHEL		IXO-XEUS	esa cnes		
	Astronomy	PILOT	ANR cnes		ARTEMIS	IRAM					
	Neutrinos	ANTARES		KM3NET	FP7			KM3	ESFRI		
	Cosmic Rays		HESS II				CTA	ESFRI			
	GRB		SVOM-ECLAIRS	cnes			ECLAIRS DATA CENTER				
	Black Holes			SIMBOL X	cnes			SIMBOL X DATA CENTER			
Elementary Constituents	Standard Model	CMS-ATLAS			SLHC DETECTORS		ESFRI		e ⁺ e ⁻ DETECTORS	ESFRI	
	Neutrinos			DOUBLE CHOOZ							
	CP Violation		T2K DETECTORS				T2K UPGRADE			v SUPER BEAM	
	Nucleon structure		COMPASS	FP7		CLAS 12 DETECTOR	ANR	FP7			
States	Exotic nuclei		AGATA			S3 - SPIRAL II DETECTORS	ESFRI				
	Quark-gluon Plasma	ALICE				ALICE UPGRADE					
Accelerators Magnets	CERN injecteurs	LINAC 4 SPL			EUCARD	FP7					
	e ⁺ e ⁻ Colliders		CTF3					e ⁺ e ⁻ ACCELERATOR	ESFRI		
	SPIRAL II		SPIRAL II CONSTRUCTION	ESFRI				EURISOL	ESFRI		
	Accelerator Magnets		Upgrade of LHC MAGNETS			FAIR CONSTRUCTION	ESFRI				
	Spectrometers	FAIR GLAD	FP6		CLAS 12 SOLENOID	Jefferson Lab		e ⁺ e ⁻ SPECTROMETER	ESFRI		
Nuclear Energy	Fusion Magnets	W7X	IPP Max-Planck-Institut für Plasmaphysik			JT 60SA	EURATOM				
	High Intensity	IPHI		IFMIF EVEDA	EURATOM		ESS	ESFRI		IFMIF	ESFRI
	Nuclear DATA	nTOF		FAIR/R3B-TPC			NFS			FELISE	
Detectors	Spectro imaging	CdTe IMAGERS	cnes			BOLOMETERS	cnes				
	Micropattern		EUDET	FP7		RD51					
Data & Simulations	Grid	GRIF	ESFRI	FP7		GRILLE DE PRODUCTION					
	Simulations	STARS2	ESFRI	ERC PQCD	ANR	SPARSEASTRO	ERC				
Society	IRM Magnets	ISEULT	oseo								
	XFEL					XFEL CRYOMODULES	ESFRI				



Janvier 2009

EU Agencies



FR Agencies



Other Institutes



Scientific Production of the Institut

REVUES A FORT IMPACT	<i>Nature</i>	<i>Science</i>	<i>Physical Review Letters</i>
2005	1	9	64
2006	6	2	53
2007	2	3	61
2008	2	2	65
2009	3	6	58
Total	14	22	301
2005-2009			

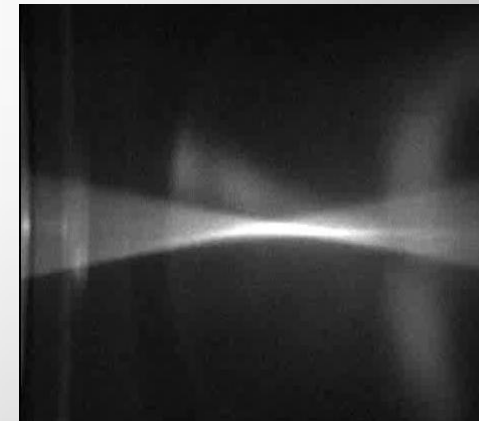
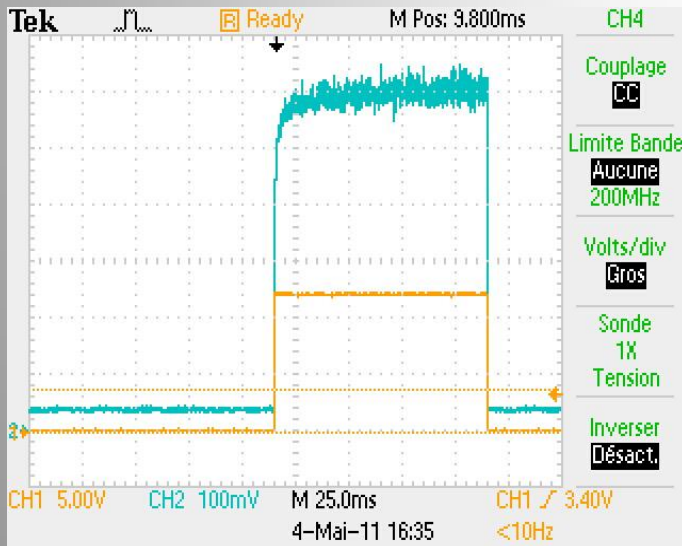
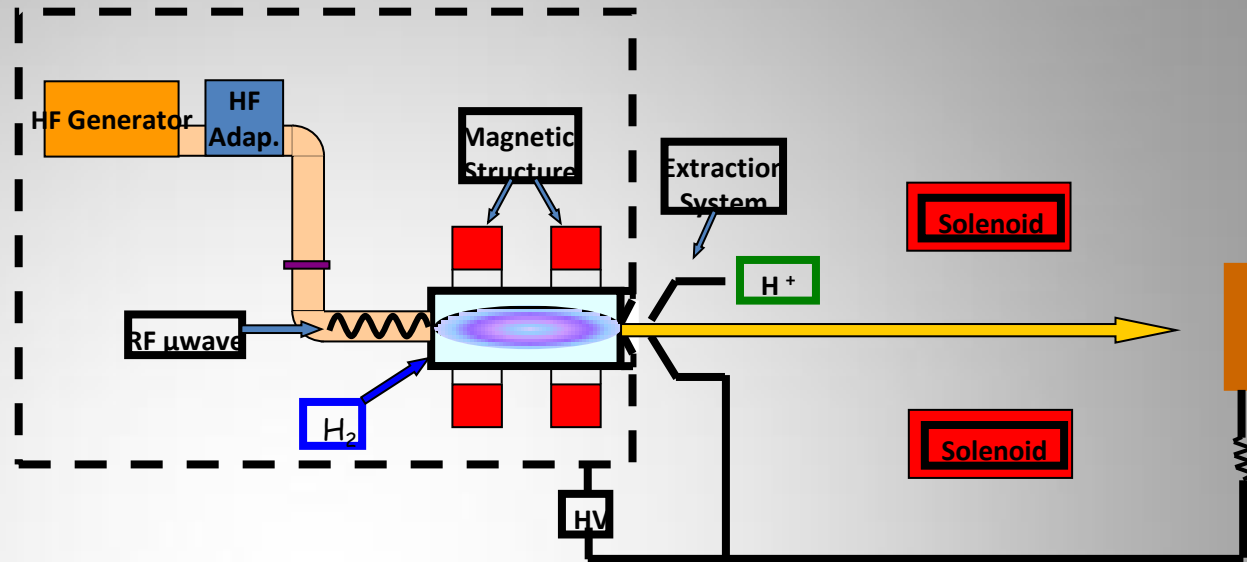
Dear Colleagues Welcome to the DITANET

Topical Workshop on

High Intensity Proton Beam Diagnostics

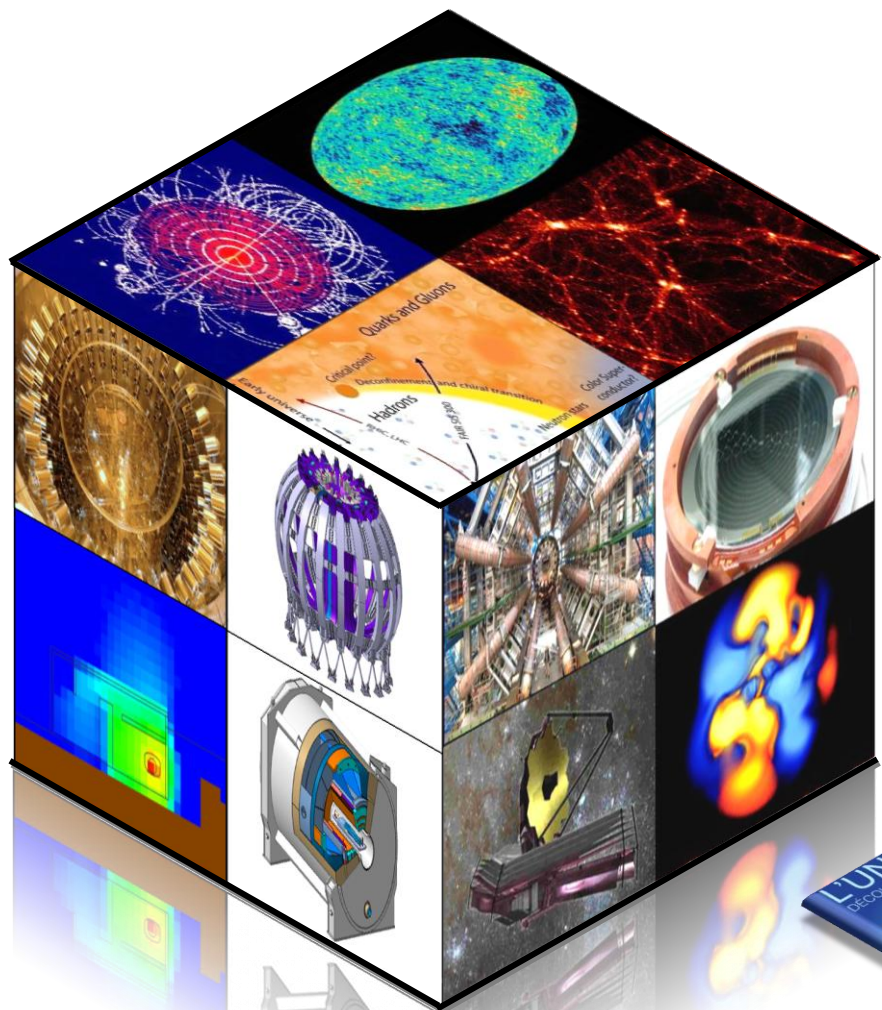
Faisceau de Protons:

V source: 65 kV
 V EI: 28 kV
 P rf: 500 W (100 ms/2Hz)
 Inj gaz: 2 sccm
 Sol1: 70 A
 I CF: 15 mA



Quelques pulses : faisceau de H⁺,
 30 mA à 50 keV (juillet 2011)





IRFU