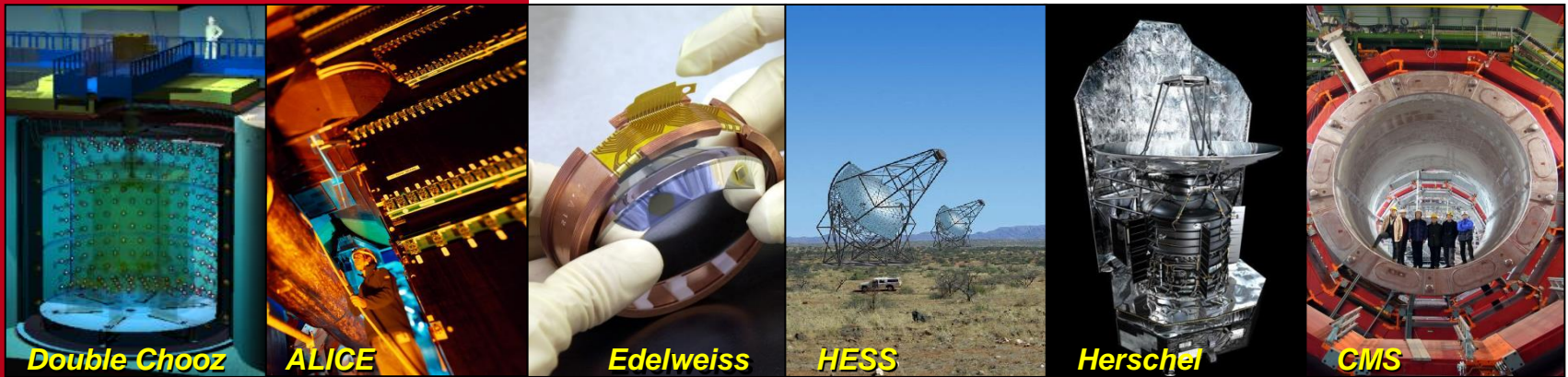


DE LA RECHERCHE À L'INDUSTRIE

cea

# SCIENTIFIC COUNCIL IRFU 2015



*Interpreting radiations from the Universe.*

Irfu



Philippe CHOMAZ

JANUARY 2015

- **-1- Monitoring of evolutions since the last council**
  - In response to the various evaluations and councils
  - In response to general constraints
  - In response to opportunities
  
- **-2- Evaluation of the actions responding to Irfu evaluation**
  
- **-3- Proposal to improve science and management**



- 1 -

## ORGANISATION

Irfu



**Head of Institute**

**Philippe Chomaz**  
Assistant: Josiane Parnas  
Deputy: **Nicolas Alamanos**  
**Marie-Cécile AUBERT**

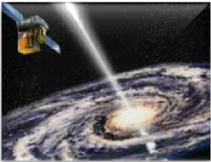
**Larsim**  
Research on sciences matter lab  
**Etienne Klein**

**Assistants**

Quality & Environment	TBD
Project	Emmanuelle Bougamont
Communication	Sophie Kerhoas-Cavata
Budget	Nathalie Judas
Europe Programs	Sylvie Leray
Industrial Partnerships	Christine Porcheray
Human Resources	Christine Tiquet

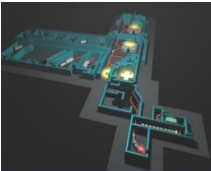
**Delegates**

Continuing education	Emmanuelle Bougamont
Computing & Simulation	Allan-Sacha Brun
Evaluation	Pascal Debu
Safety	Alain Le Saux
Computing ressources	Michel Mur
PhD Students	Jérôme Rodriguez
Scientific Information	Angèle Séné
In-kind follow-up	Antoine Dael



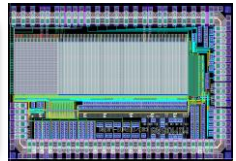
**SAP**  
Astrophysics and  
Space Technologies  
**Anne Decourchelle**  
*Dep. Head: Michel Talvard*

**SACM**  
Accelerators, Cryogenics  
and Magnetism  
**Pierre Védrine**  
*D. Head: P Chesny, O Napoly*



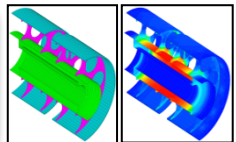
**SPhN**  
Nuclear Physics  
**Héloïse Goutte**  
*Dep.Head: Jacques Ball*

**Sedi**  
Detectors, Electronics  
and Computing  
**Eric Delagnes**  
*Dep. Head: Philippe Bourgeois*



**SPP**  
Particle Physics  
**Anne-Isabelle Etievre**  
*Dep. Head: Georges Vasseur*

**SIS**  
Mechanical Design  
and System Engineering  
**Florence Ardellier**  
*Dep. Head: Frédéric Molinié*



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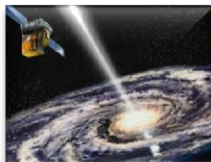
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Project **Emmanuelle Bougamont**  
Communication **Sophie Kernoas-Cavata**  
Budget **Nathalie Judas**  
Europe Programs **Sylvie Leray**  
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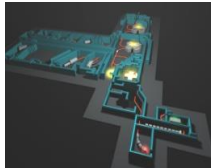
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Continuing education **Emmanuelle Bougamont**  
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Irfu Organization



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Nuclear Physics  
**Héloïse Goutte**  
Dep. Head: Jacques Ball

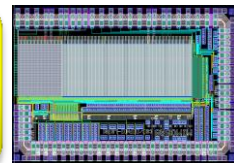


**SPP**  
Particle Physics  
**Anne-Isabelle Etievre**  
Dep. Head: Georges Vasseur

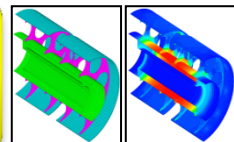
**SACM**  
Accelerators, Cryogenics  
and Magnetism  
**Pierre Védrine**  
D. Head: P. Choisy, O. Napoly



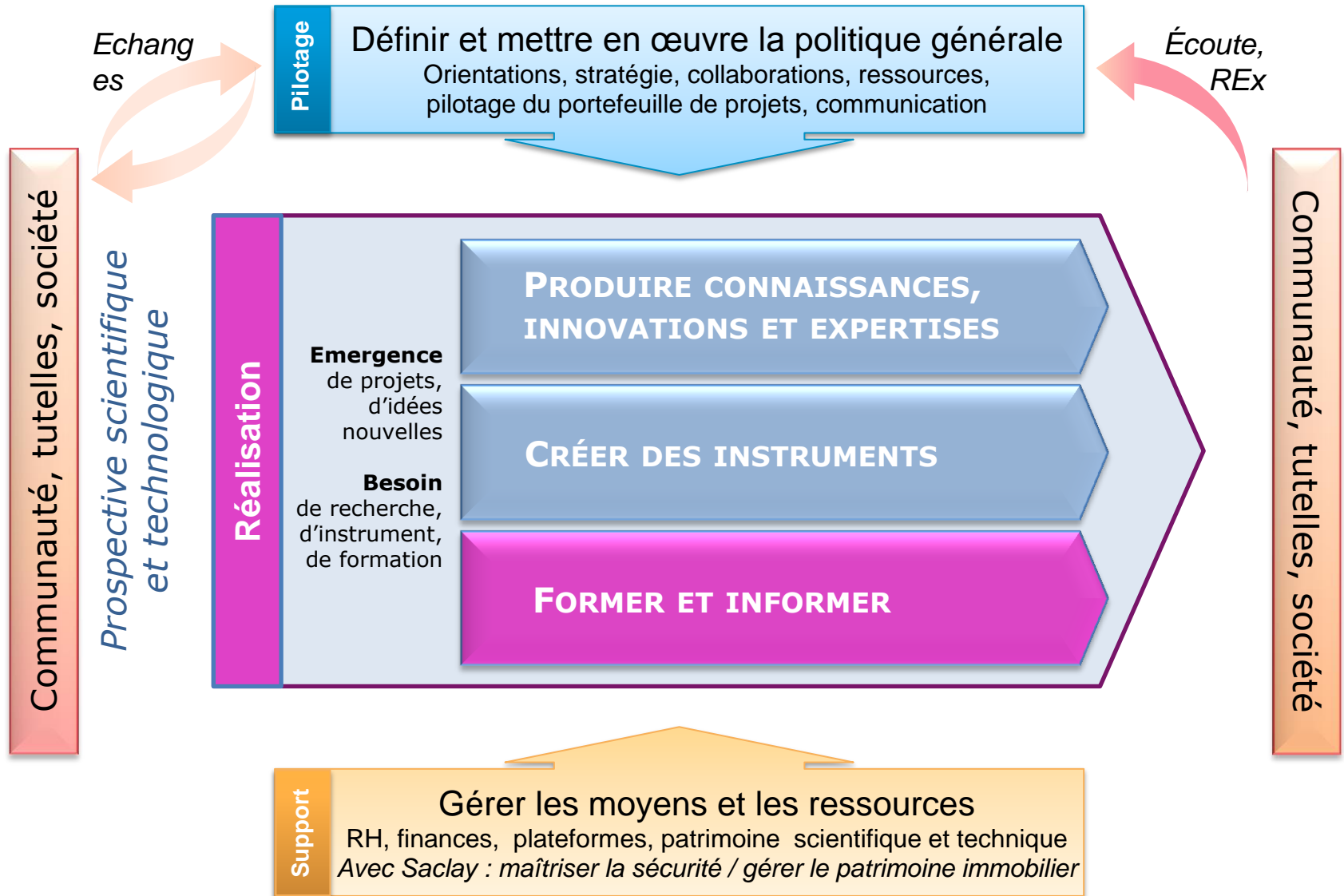
**Sedi**  
Detectors, Electronics  
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**Eric Delagnes**  
Dep. Head: Philippe Bourgeois



**SIS**  
Mechanical Design  
and System Engineering  
**Florence Ardellier**  
Dep. Head: Frédéric Molinié



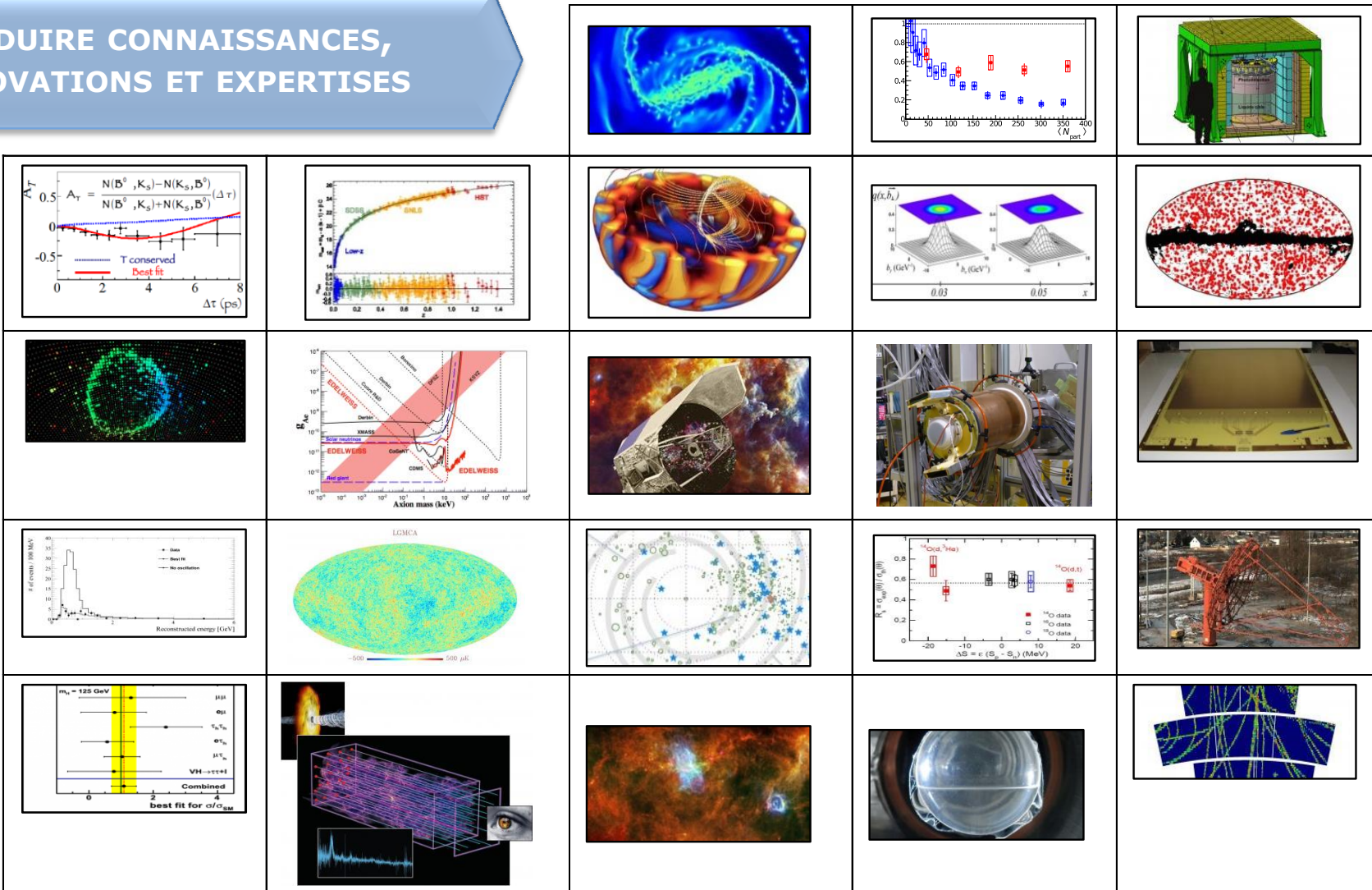
# CARTOGRAPHIE DES PROCESSUS DE L'IRFU



# CARTOGRAPHIE DES PROCESSUS DE L'IRFU

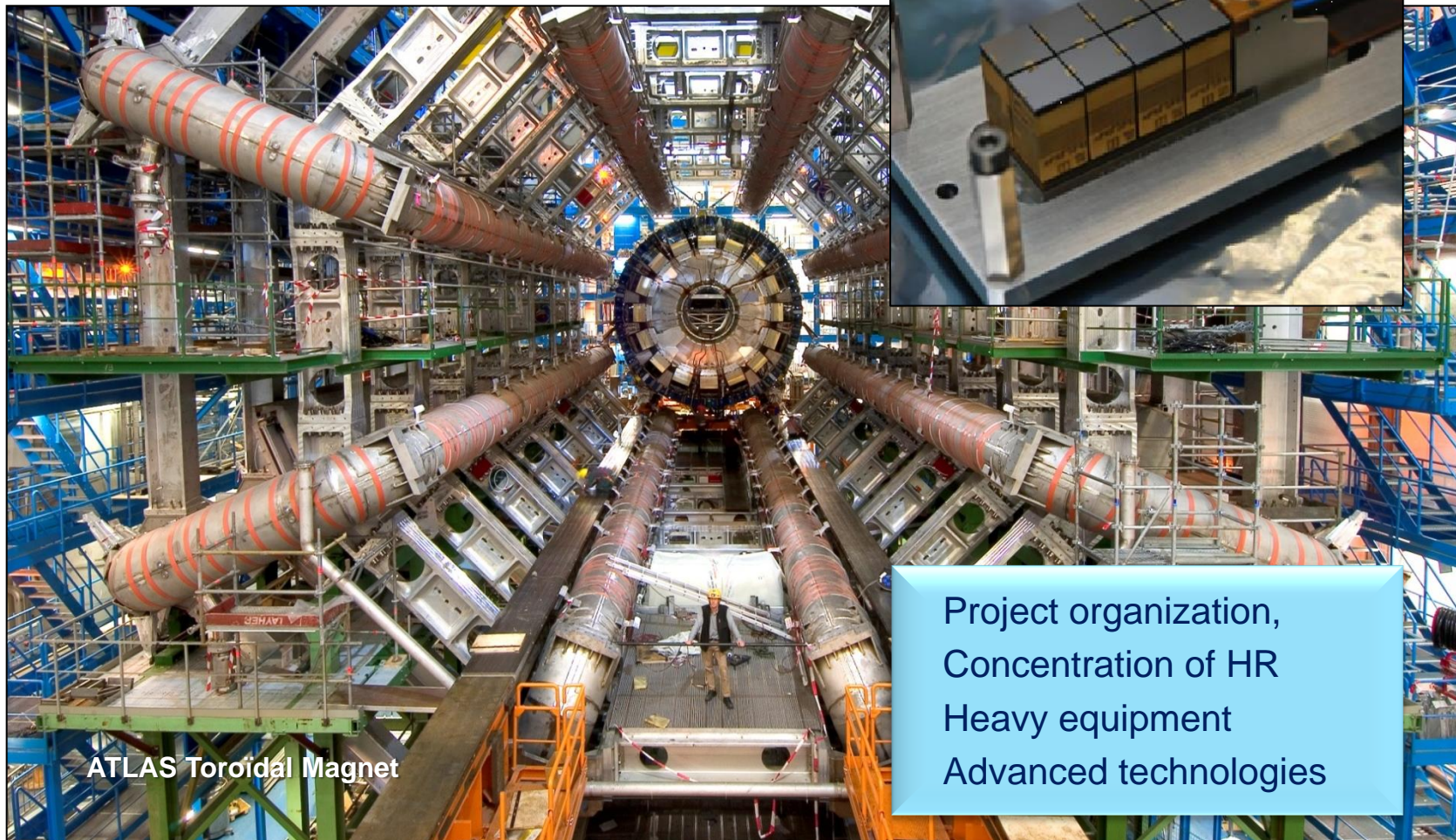


PRODUIRE CONNAISSANCES,  
INNOVATIONS ET EXPERTISES





## CRÉER DES INSTRUMENTS

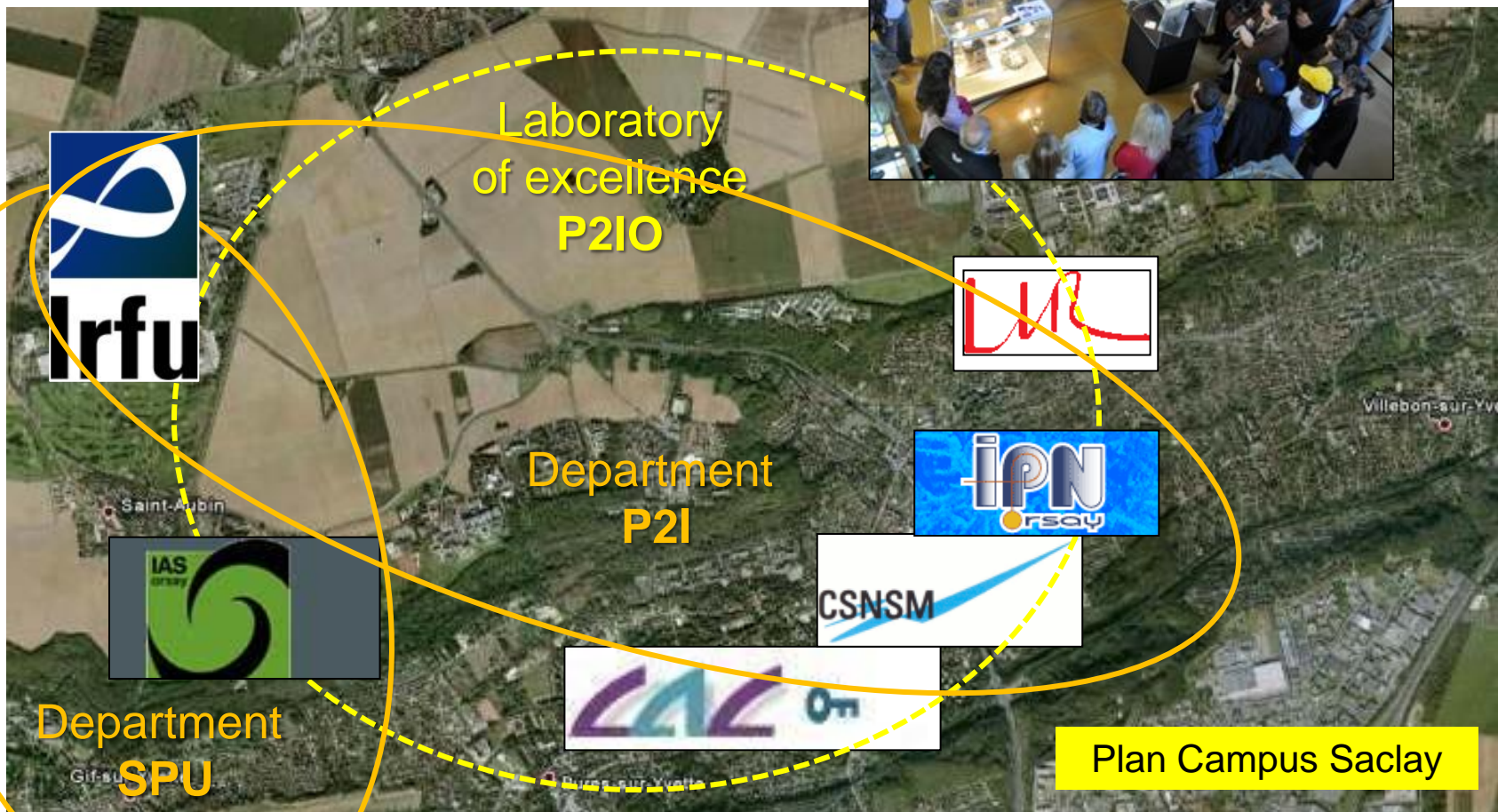


ATLAS Toroidal Magnet

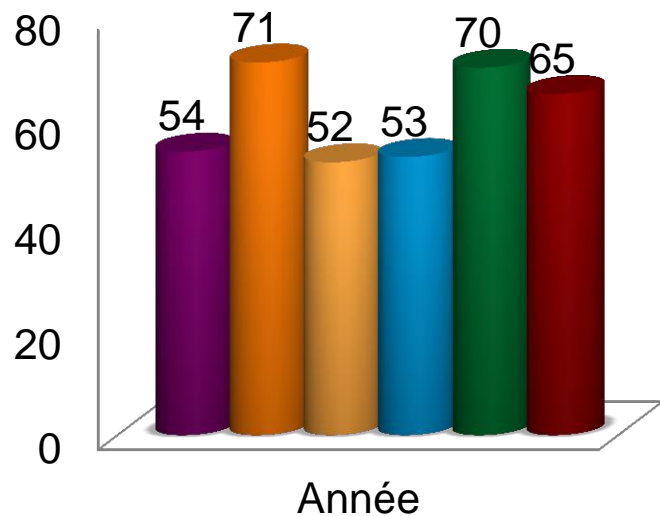
MACSI, une caméra X en CdTe

Project organization,  
Concentration of HR  
Heavy equipment  
Advanced technologies

FORMER ET INFORMER

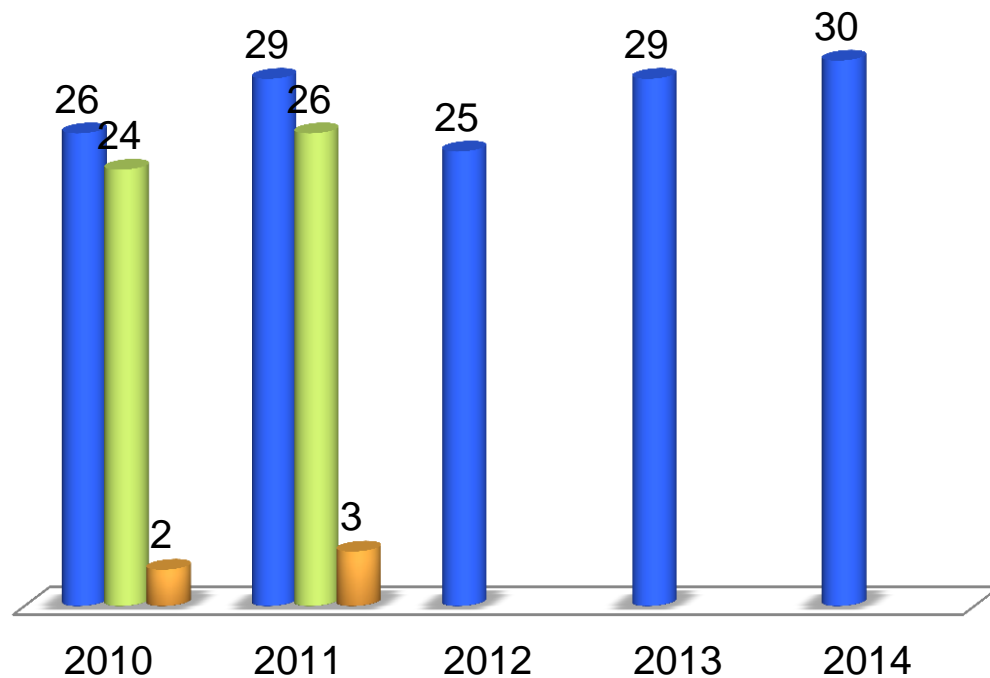


- Propositions de thèses
- Livret – forum - foires
- Thèses instrumentales



- 2010 ■ 2011 ■ 2012
- 2013 ■ 2014 ■ 2015

- Thèses débutées
- Soutenues (N+3)
- Soutenues (N+4)



- Thèses en cours à l'Irfu

## 2013

**24 soutenances** N+3, donnée partielles sur 21

- **57.15% recherche:**  
10 post-doc, 1 ATER, 1 CDD CERN
- **14.3% Enseignement :**  
2 secondaire,  
1 prepa agreg.
- **19.05 % Industrie :**  
3 CDI,  
1 création entreprise
- **9.5% Autres :**  
1 CDI priv,  
1 « retour pays »

## 2014 (en cours):

**26 soutenances** N+3 + 2 N+4 (début 2010), donnée partielles sur 27

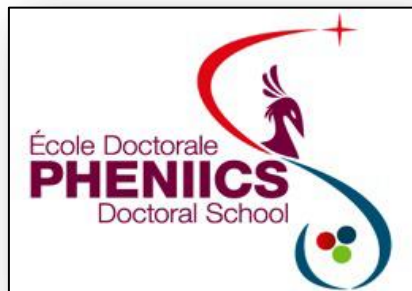
- **59.3% recherche**  
13 post-doc,  
2 ATER  
1 formation physicien médical
- **14.8% Enseignement**  
1 prepa agreg,  
2 enseignants secondaire  
1 préparateur ENS
- **14.8% Industrie**  
3 CDI  
1 auto-entrepreneure
- **3.7% CDI DGA**
- **7.4 % inconnu**

**ExplorUnivers** est un MOOC de culture générale sur les sciences de l'Univers.



- ✓ culture générale sur les sciences de l'Univers pour un large public
- ✓ dure 6 semaines et propose 2 séquences thématiques hebdomadaires
- ✓ en ligne sur la plateforme FUN (France Université Numérique)
- ✓ inscription dès le 11/12/2014, cours en ligne du 2 mars au 17 avril 2015
- ✓ 6 intervenants scientifiques du SAP sur 9 au total

MOOC de l'école doctorale PHENIICS (Particules, Hadrons, Energie et Noyau : Instrumentation, Imagerie, Cosmos et Simulation)



- ✓ Reçu une réponse >à d'un APP de la FCS « former avec le numérique »
- ✓ 200 étudiants travaillant sur des thématiques de physique subatomique allant de la physique fondamentale jusqu'à ses applications et ses interfaces
- ✓ 20 heures réparties sur 12 semaines d'octobre 2015 à mi-janvier 2016
- ✓ conçu et coordonné par 3 coopérateurs IRFU/IPN et LAL
- ✓ 20 intervenants scientifiques (SPP, SPhN, SAP, Sedi, SACM) sur 65 au total



- II -

## **BILAN 2013 ET OBJECTIFS 2014 PRÉSENTÉS PAR THÈMES**

# Irfu



### ■ RF en SM en liaison avec les TGI

Recherche sur les lois fondamentales de l'univers

■ Co-Leader avec le CNRS (INSU et IN2P3)

■ Objectifs

- *Quels sont les constituants élémentaires de la matière?*
- *Quel est le contenu énergétique de l'univers ?*
- *Comment l'univers est-il structuré ?*
- *Comment s'organise la matière nucléaire?*

### ■ TGI et RF en SM en liaison avec les TGI - Cryotechnologies

■ Objectifs

- *Aimants Supraconducteurs*
- *Installations de tests cryogéniques*
- *Sources et injecteurs d'ions*
- *Accélérateurs supraconducteurs*

### ■ RF en SM en liaison avec les TGI

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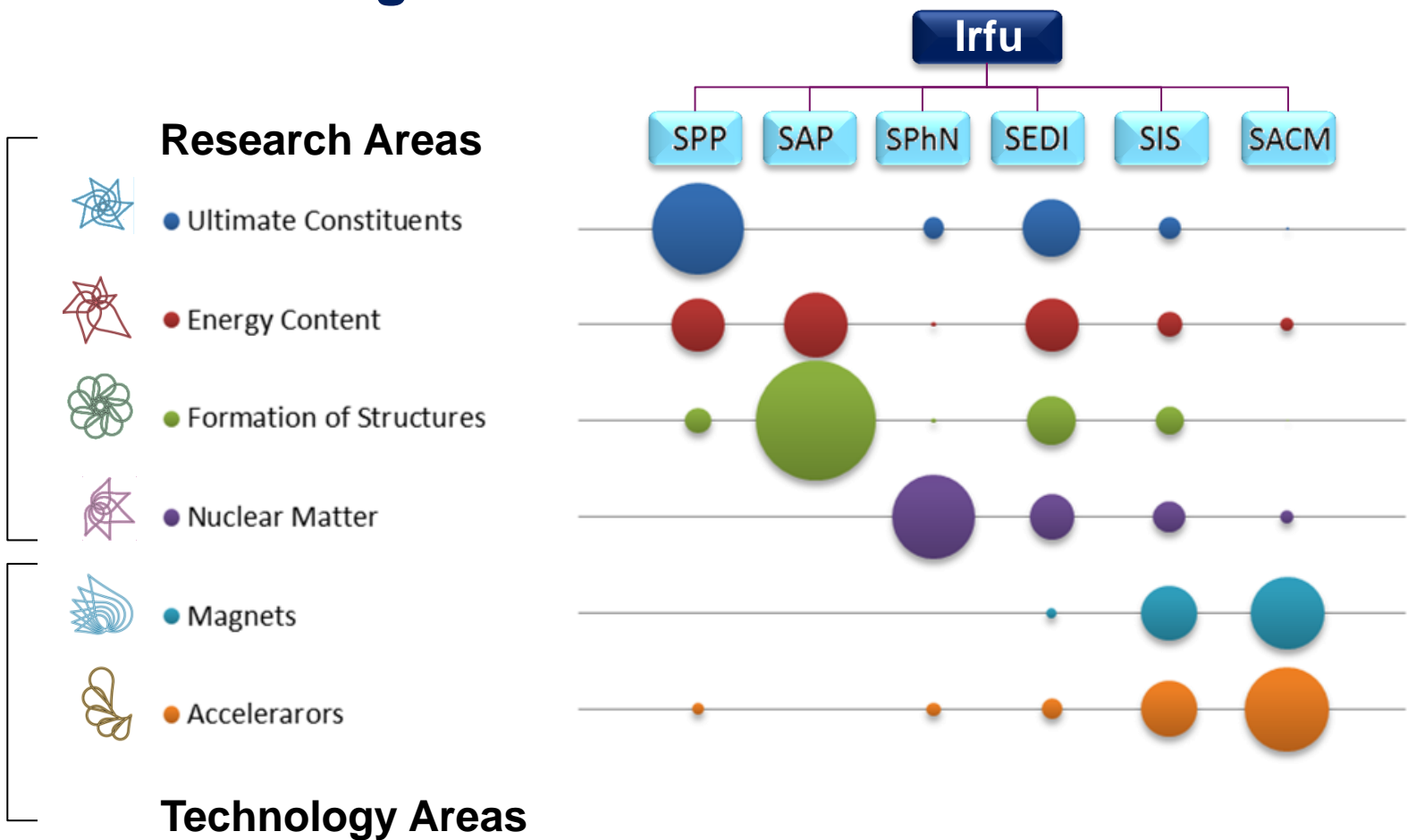
### ■ TGI et RF en SM en liaison avec les TGI - Cryotechnologies

■ Objectifs

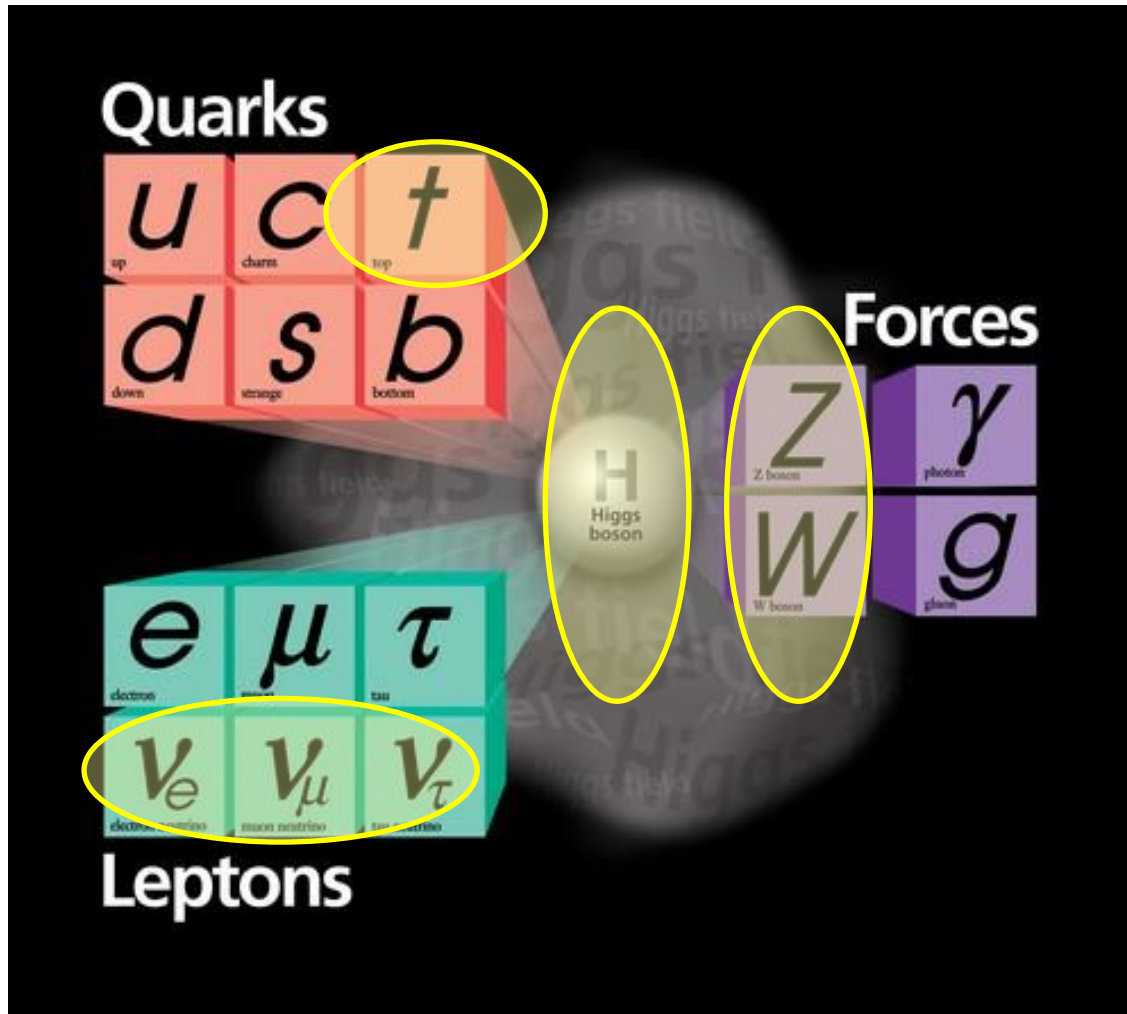
- *Aimants Supraconducteurs*
- *Installations de tests cryogéniques*
- *Sources et injecteurs d'ions*
- *Accélérateurs supraconducteurs*



## Irfu Matrix organisation



- Quels sont les constituants élémentaires de la matière ?

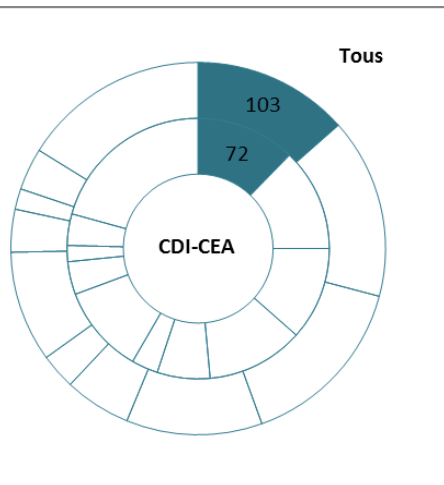


## Résultats 2014

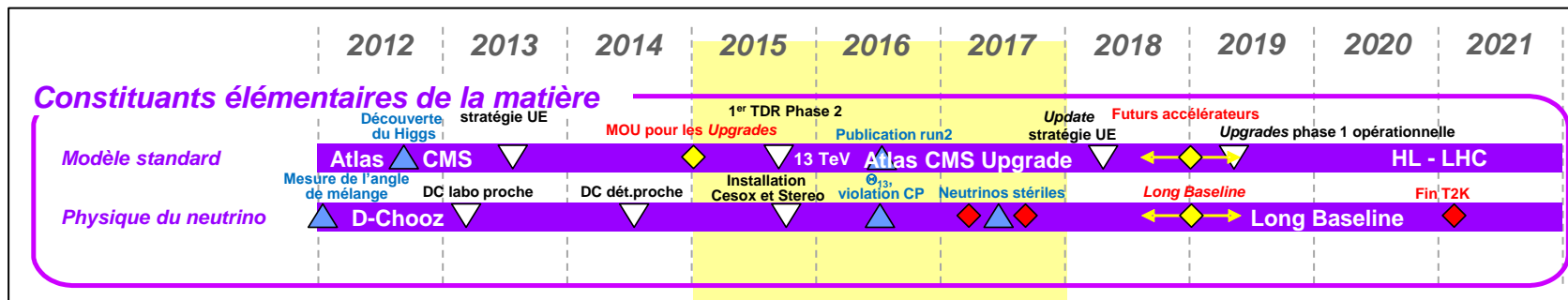
- Etude du Higgs et EWSB
  - Publications RUN1
  - Upgrades LHC
- Démarrage Double-Chooz
- Cesox, Stereo:  
Avancées importantes
- R&D Neutrino:  
avancée sur proto TPC  
long baseline
- Post-LHC  
Lancement de FCC  
R&D aimants CERN

## 2015

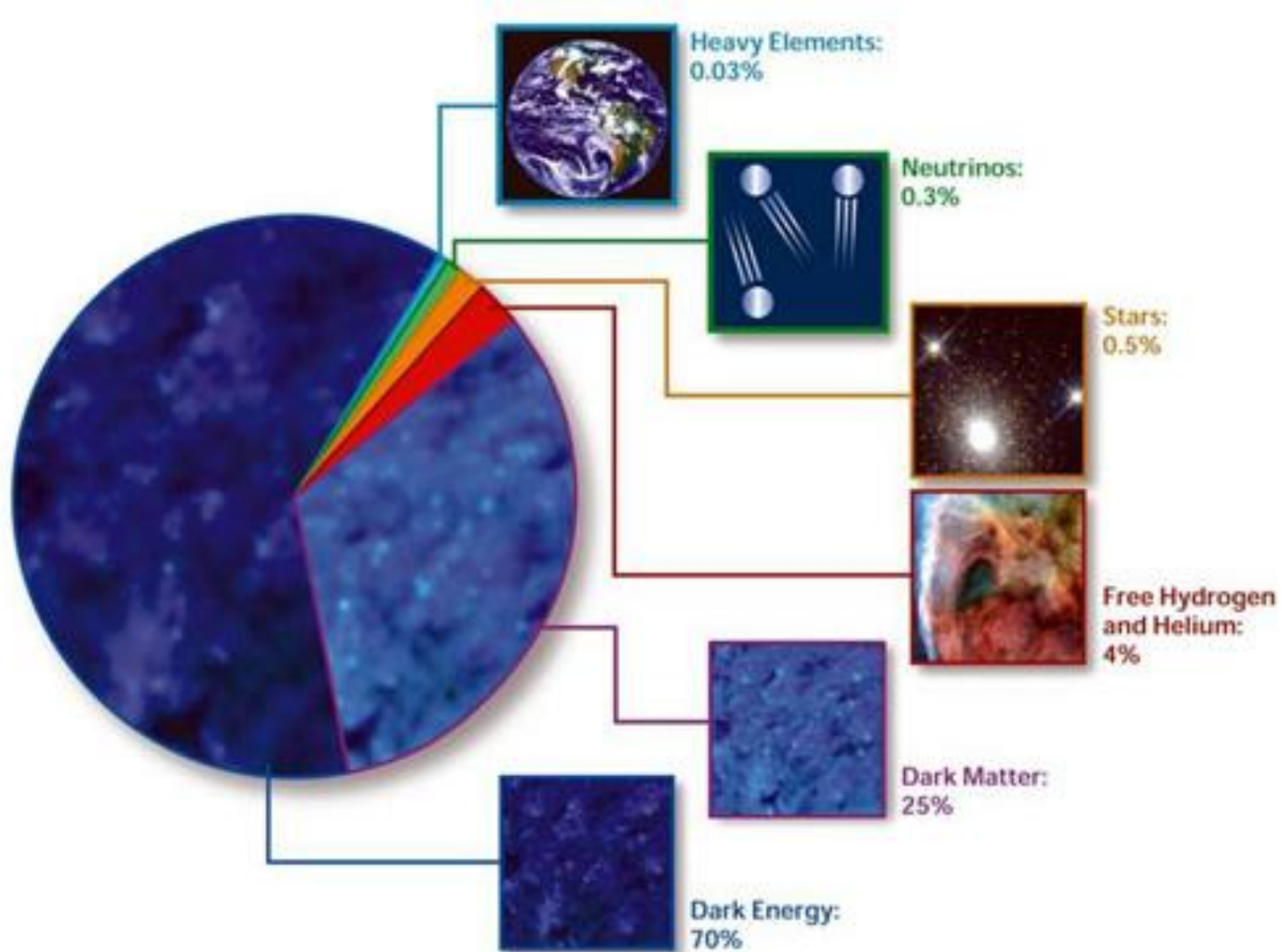
- Etude du Higgs, BSM
  - redémarrage LHC RUN2
  - upgrade LHC (ATLAS upgrade  
MOU, démonstrateur NSW)
  - implications phase 2
- Double-Chooz, T2K  
→ Publications
- Cesox, Stereo:  
Préparation à la prise de  
données
- R&D Neutrino:  
MoU WA105 (proto TPC)



PLAN D'INVESTISSEMENT IRFU					
2 014			2 015		
Dépenses	Recettes		Dépenses	Recettes	
Investissements	Subvention et marges sur PL	Ressources Externes	Investissements	Subvention et marges sur PL	Ressources Externes
Double chooz	672	300	110	110	
CELAND	578.6		578.6	540	40 500
CALIPSO	60	10	50	65	10
Up Grade ATLAS	190		190	740	740
UP Grade CMS	0		0	50	50
STEREO	37		37	100	100



## ■ Quel est le contenu énergétique de l'univers ?

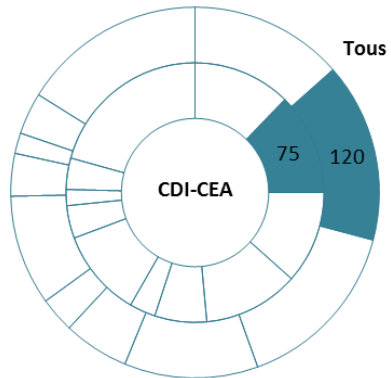


## Résultats 2014

- Revues ESA instruments Euclid
- Résultats CMB de Planck
- Edelweiss III: prise de données
- CD1 DESI
- CTA miroirs

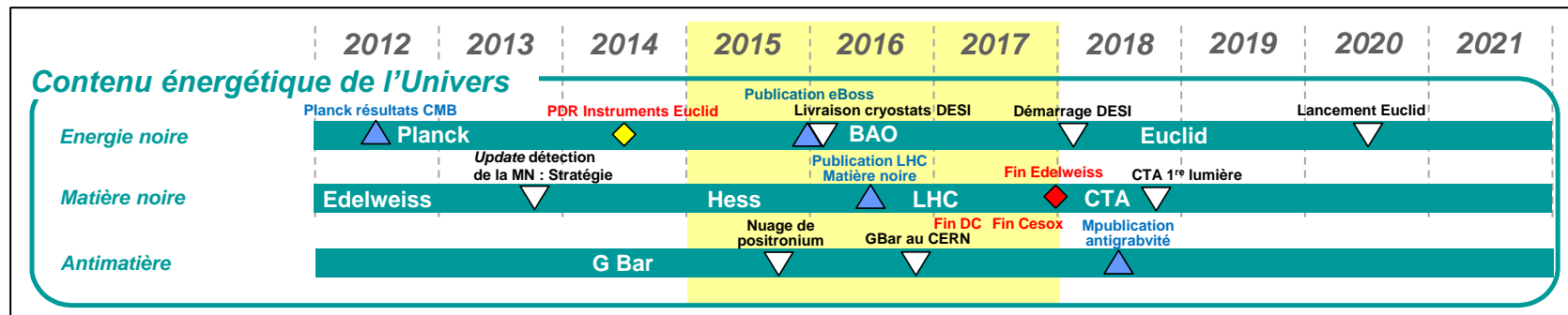
## 2015

- Revues ESA Segment Sol Euclid
- Premier vol PILOT
- Démarrage ERC Armault
- Edelweiss III : résultats
- DESI: décision DOE, , livraison du 3<sup>ème</sup> cryostat
- CTA : assemblage modules caméra
- GBAR : nuage de positronium

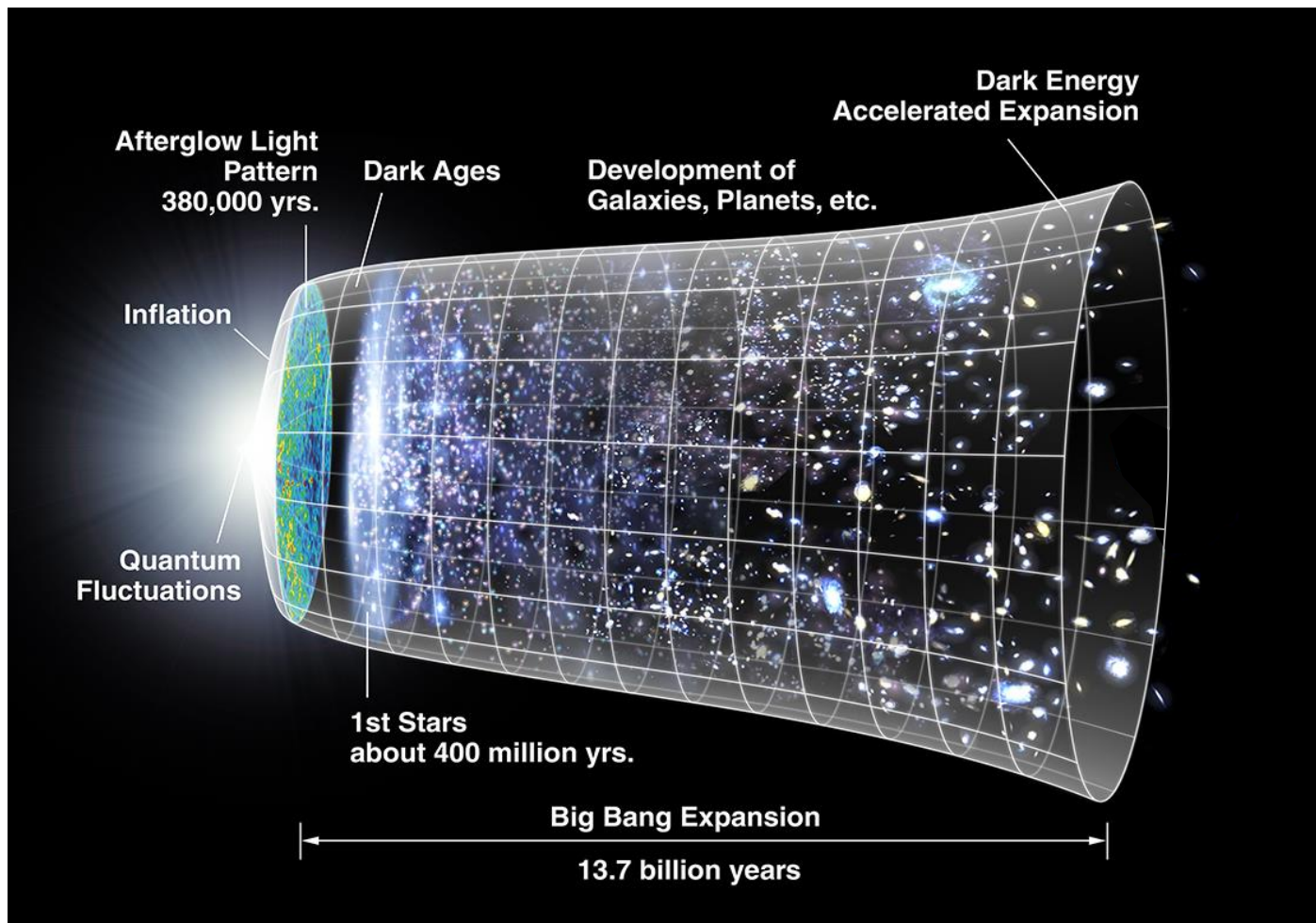


## PLAN D'INVESTISSEMENT IRFU

	2 014			2 015		
	Dépenses	Recettes		Dépenses	Recettes	
	Investissements	Subvention et marges sur PL	Ressources Externes	Investissements	Subvention et marges sur PL	Ressources Externes
EUCLID	776		776	1201		1201
CTA	200	175	25	165	165	
Anti hydrogène/Gba	73	73		100	100	
Edelweiss	27		27	20		20
BAO	70	70		40	40	



## ■ Comment l'univers est-il structuré ?





## Résultats 2014

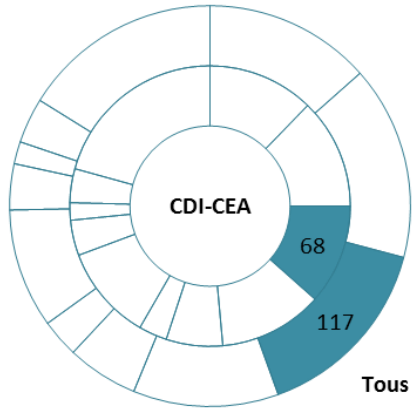
- Décision ELT
- Caméra submm ArTéMiS APEX (ESO) à 350  $\mu\text{m}$
- Redémarrage de SVOM
- Revue CTA
- Solar Orbiter (Calistes)
- Sélection ESA L2, M3

## 2015

- Démarrage ELT - METIS
- Caméra submm ArTéMiS APEX (ESO) à 350 et 450  $\mu\text{m}$
- Revue SVOM en Chine
- Camera CTA
- Solar Orbiter (Dernier lot Calistes)
- Démarrage phase A L2 Athena
- Lancement Astro-H

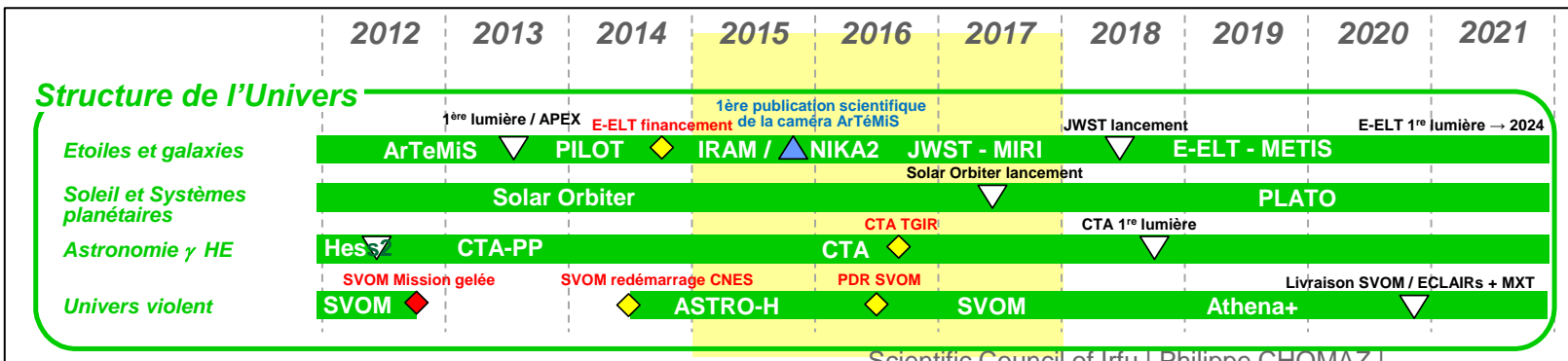
# LOIS FONDAMENTALES DE L'UNIVERS

## STRUCTURE DE L'UNIVERS



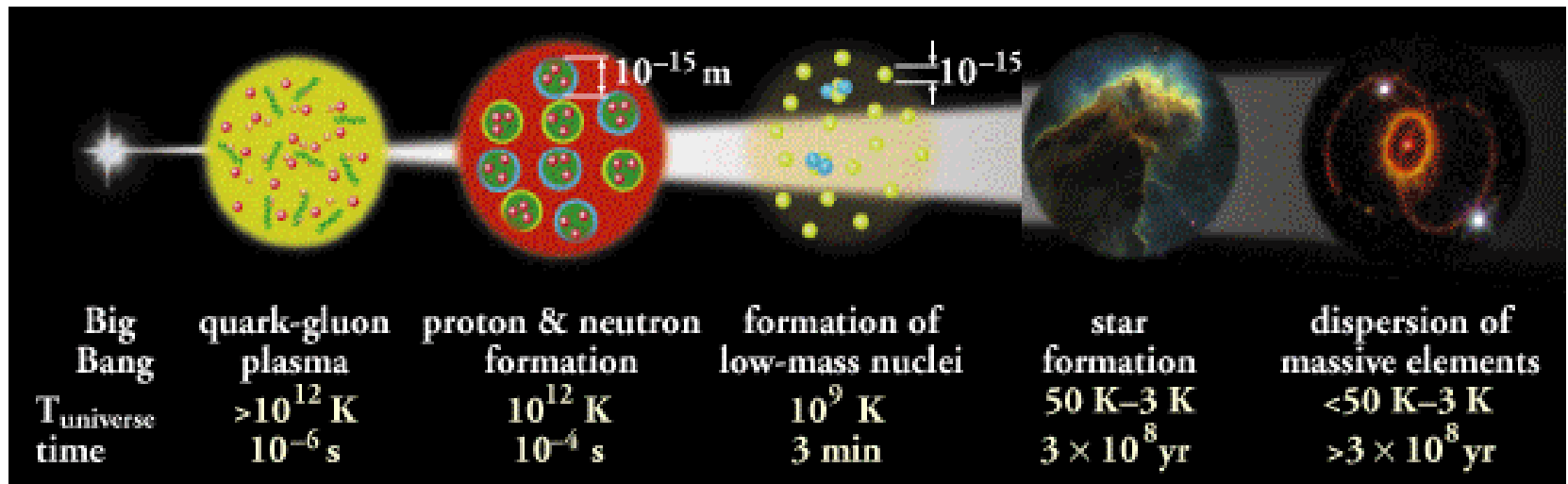
### PLAN D'INVESTISSEMENT IRFU

	2 014			2 015		
	Dépenses	Recettes		Dépenses	Recettes	
	Investissements	Subvention et marges sur PL	Ressources Externes	Investissements	Subvention et marges sur PL	Ressources Externes
ARTEMIS	73	73		20	20	
Solar Orbiter/STIX	260		260	200		200
ELT-METIS				40		40
SAFARI SPICA	55		55	50		50
Missions M3 (Echo,	38		38	50		50
SVOM	23		23	1 000		1 000
CTA	200	175	25	165	165	
Calculs et simulatio	267	150	117	250	150	100



## ■ Comment s'organise la matière nucléaire ?

Plasma, hadrons, noyaux



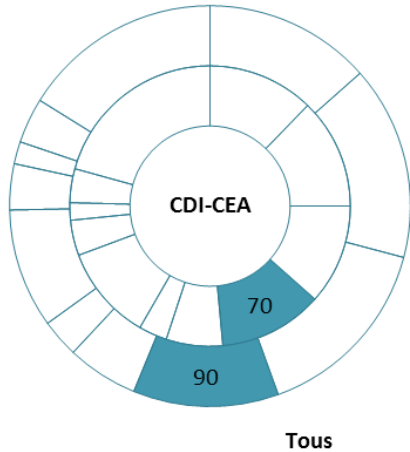
## Résultats 2014

- Résultats ALICE p+Pb  
Upgrades LHC
- Résultats CLAS-GPD
- Détecteur CLAS12
- Démarrage Spiral2
- Avancée S3
- Avancée NFS

## 2015

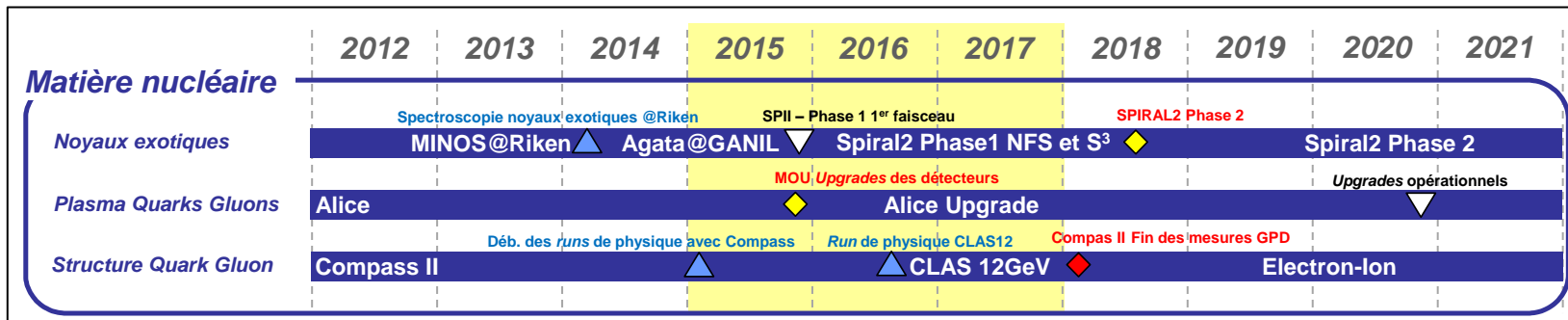
- Signature MOU ALICE-MFT
- Codes Parton
- Détecteur CLAS12 (livraison)
- Tomographie muonique du  
"château d'eau centre de  
Saclay"
- Avancée S3 (Triplet)
- Premières publications MINOS

# LOIS FONDAMENTALES DE L'UNIVERS MATIÈRE NUCLÉAIRE



## PLAN D'INVESTISSEMENT IRFU

	2 014			2 015		
	Dépenses	Recettes		Dépenses	Recettes	
	Investissements	Subvention et marges sur PL	Ressources Externes	Investissements	Subvention et marges sur PL	Ressources Externes
UP Grade ALICE	216		216	450		450
Agata	5	5		75	75	
Clas 12Gev	184	90	72	170	100	70
Compass II	118	35	83	54	54	
S3	140	6	134	161	161	
NFS	32	32		20	20	
MINOS	43		43			
Chymène	5		5			



### ■ RF en SM en liaison avec les TGI

Recherche sur les lois fondamentales de l'univers

■ Co-Leader avec le CNRS (INSU et IN2P3)

■ Objectifs

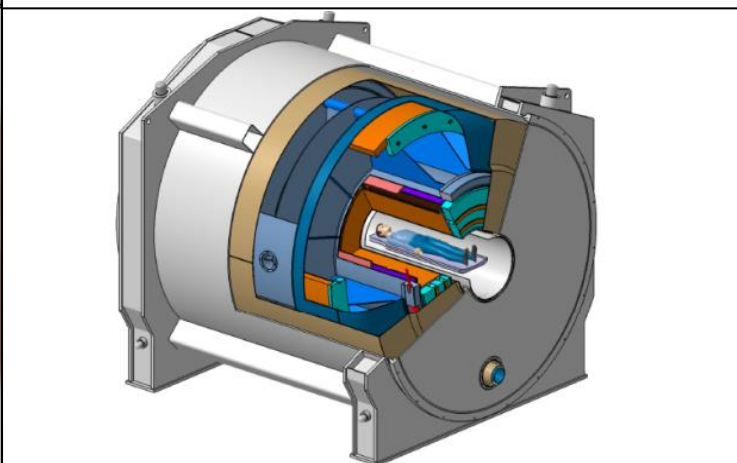
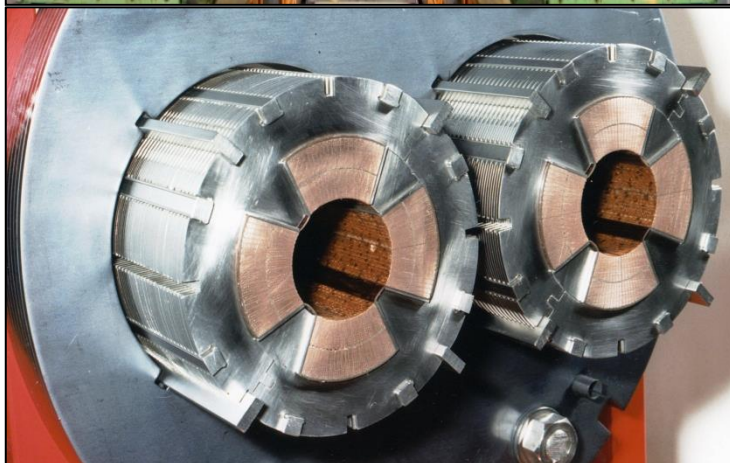
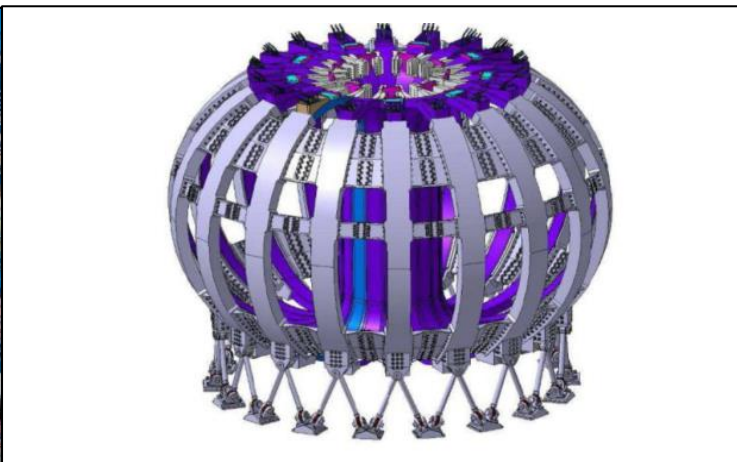
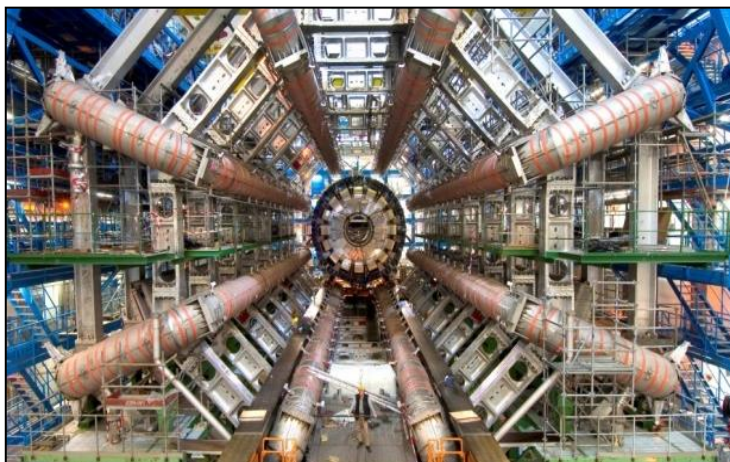
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- *Comment l'univers est-il structuré ?*
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### ■ TGI et RF en SM en liaison avec les TGI - Cryotechnologies

■ Objectifs

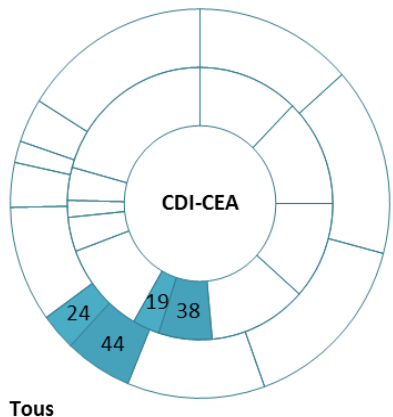
- ***Aimants Supraconducteurs***
- ***Installations de tests cryogéniques***
- *Sources et injecteurs d'ions*
- *Accélérateurs supraconducteurs*

## ■ Aimants Supraconducteurs : Technologie clef



# TGI ET CRYOTECHNOLOGIES

## AIMANTS SUPRA PLATEFORMES CRYO



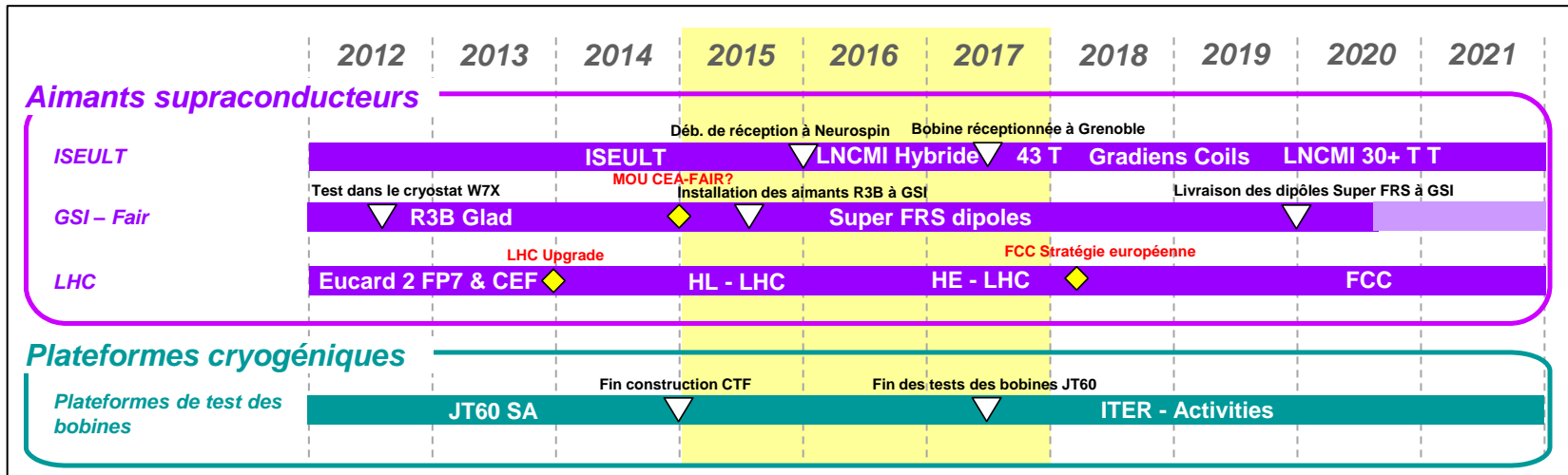
### PLAN D'INVESTISSEMENT IRFU

2 014		
Dépenses	Recettes	
Investissements	Subvention et marges sur PL	Ressources Externes

2 015		
Dépenses	Recettes	
Investissements	Subvention et marges sur PL	Ressources Externes

ISEULT	1 400		1 400
R3B Dirac	411		411
JT60 CTF	1 985	1 111	
JT60 TFC	2 427	4 140	

	1 600		1 600
	100		100
	1 500	237	
	4 598	2 751	

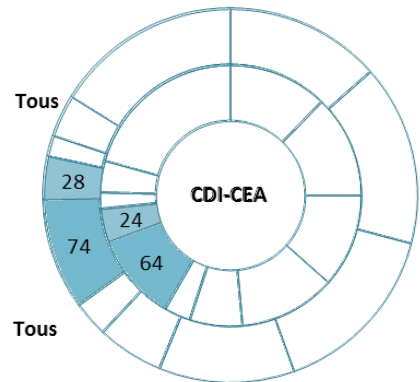




## ■ Accélérateurs supraconducteurs → Frontière énergie/puissance

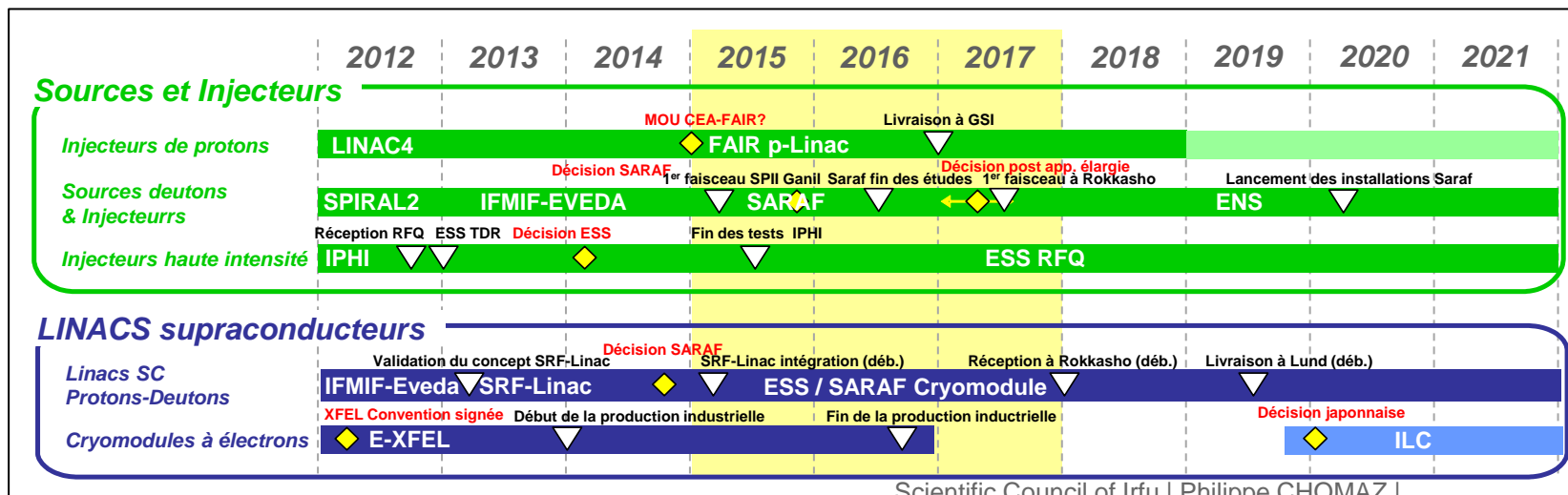
- **Physique particules, physique nucléaire**
  - Accélérateurs haute luminosité, SPIRAL2, SARAF2
  - Sources de muons, neutrinos, noyaux exotiques
  - ILC, Accélérateurs linéaire
- **Source de lumière**
  - XFEL
- **Sonde neutron**
  - ESS
- **Physique des matériaux et fusion**
  - IFMIF
- **Transmutation et énergie nucléaire**
  - ADS et MYRRHA

# TGI ET CRYOTECHNOLOGIES ACCÉLÉRATEURS : SOURCES ET INJECTEURS SC LINACS



## PLAN D'INVESTISSEMENT IRFU

	2 014			2 015		
	Dépenses	Recettes		Dépenses	Recettes	
	Investissements	Subvention et marges sur PL	Ressources Externes	Investissements	Subvention et marges sur PL	Ressources Externes
XFEL	3 000	1 960		4 500	1 595	
IFMIF EVEDA	5142	0		4978	1691	
FAIR	200	560		360		
ESS Contract	2500		2500	1750		1750
ESS IN KIND				3860		3860

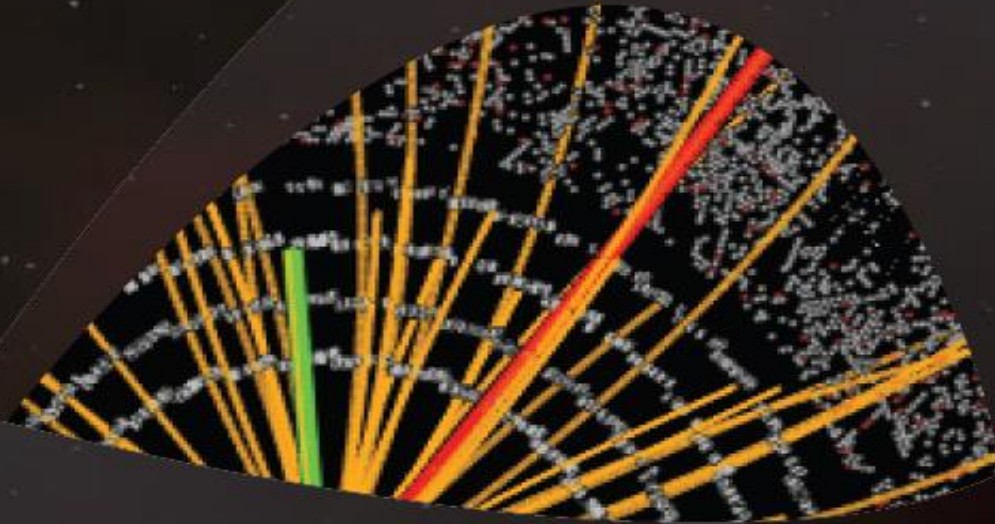




# Irfu



### 3) AERES EVALUATION



**Irfu 2020 Plan  
2008-2013 Report**

## ■ Step 1: year 2013, 2008-2013 Report and 2020 Project

- Collective work on the data and documents
- Exhaustive report: activities, results, organisation...
- 5 years or more project for sciences and technologies
- CSI evaluation in June 2013



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- High Level International Committee
- Informative presentations and laboratory visits
- Important meeting with the Staff



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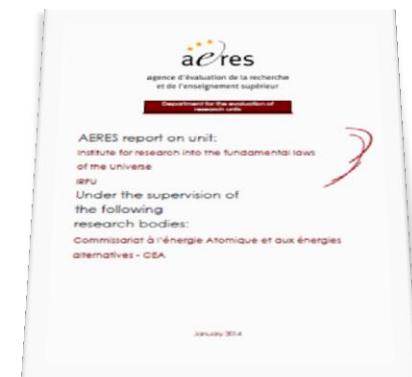
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## ■ Step 3: Second quarter of 2014, the AERES report

- April 2014, first draft
- April 2014, Irfu corrections (only errors) and comments
- June 2014, publication of the AERES evaluation of Irfu



# EXTREMELY POSITIVE AERES EVALUATION







Institute for Research into the Fundamental laws of the Universe, IRFU, CEA, Mr Philippe CHOMAZ

## Conclusions and recommendations

**The committee has been extremely impressed by the achievements of IRFU during the last five years in all fields.**

In particle physics, IRFU contributes to the leading projects with intense and visible contribution to all aspects of ATLAS and CMS and to major neutrino experiments. In astrophysics, IRFU is one of the leading laboratories in France, again with major and recognized contributions in this fast developing and exciting field. IRFU is probably unique in its ability to contribute to all steps of the experimental chain, from conception and instrument development to analysis, modelling and theory. In nuclear physics, IRFU is also a key player with strong involvement and intellectual leadership at national and international level on many different topics, from the highest energy to nuclear structure. The competence and the infrastructure on the Saclay site in the field of accelerators and superconducting magnets are unique in France and put IRFU among the world leaders in this domain. IRFU scientists are highly competent, well visible at the international level and very successful in getting external resources through national and international project calls. The strength in technology, together with the close ties with other divisions of the CEA, allows a very strong interaction with industry and contribution to societal issues in the domain of medical and nuclear applications or future energies. All these achievements would not be possible without a well constructed, project-oriented organisation which ensures also a rich scientific life in the institute and satisfaction for the personal and students.

**In a word, the committee finds the quality of IRFU to be excellent, at top level on the international scene.**



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Our recommendations are therefore mainly targeted towards the key question “*how to maintain this excellence in the future?*” given the difficulties induced by the reduction of resources, following the current economical situation.

- The know-how capitalised during the last 20 years should be protected by ensuring a continuous rejuvenation of the permanent staff and a good overlap between the newly recruited staff and the staff leaving for retirement. Particular attention should be brought to the issue of technicians who are vital for research in technological fields.
- A careful balance has to be found between large technological projects, not always directly linked to the mission of IRFU in basic science but which allow gathering external resources and projects in fundamental science which should keep some priority. In particular, these large projects should not jeopardize the technical support from SIS or SEDI towards the three physics divisions. Small innovative projects should be encouraged.
- The program must leave enough breathing space to the staff for involvement in basic R&D, which is vital for the long-term future in a competitive and fast evolving environment. This will also enable an even stronger involvement in technology and knowledge transfer.
- Links with universities, doctoral and engineering schools must be tightened and sufficient budget must be set aside to increase the number of PhD students, in particular in the technical sector. The creation of the ComUE Paris-Saclay may offer a strong opportunity for improving on this aspect.
- Difficult times imply difficult decisions and changes: frequent communication with the staff, to explain the overall strategy and collect its input, is of utmost importance to maintain motivation.

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- **Difficult times imply difficult decisions and changes: frequent communication with the staff**, to explain the overall strategy and collect its input, is of utmost importance to maintain motivation.

Our recommendations are therefore mainly targeted towards the key question “how to maintain this excellence in a difficult economic situation” in the current economic situation.

- **A) Protect and transmit know how** protected by ensuring a continuous rejuvenation of the permanent staff and a good overlap between the newly recruited staff and the staff leaving for retirement. Particular attention should be brought to the issue of technicians who are vital for research in technological fields.
- **B) Keep small innovative projects** al projects, not always directly linked to the mission of Irfu in basic science but which allow gathering external resources and projects in fundamental science which should keep some priority. In particular, these large projects should not jeopardize the technical support from SIS or SEDI towards the three physics divisions. Small innovative projects should be encouraged.
- **C) keep space for R&D** ; space to the staff for involvement in basic R&D, which is vital for the long-term future in a competitive and fast evolving environment. This will also enable an even stronger involvement in technology and knowledge transfer.
- **D) Tighten links with Paris-Saclay & education (Tech. PhD)** t aside to increase the number of PhD students, in particular in the technical sector. The creation of the ComUE Paris-Saclay may offer a strong opportunity for improving on this aspect.
- **E) Increase internal communication** communication with the staff, to explain the in motivation.

## How to maintain this excellence in difficult economical crisis

- **A) Protect and transmit know how**
- **B) Keep small innovative projects**
- **C) keep space for R&D**
- **D) Tighten links with Paris-Saclay & education (Tech. PhD)**
- **E) Increase internal communication**

## How to maintain this excellence in difficult economical crisis

- Increase our resource to minimize crisis effect (see budget)
- **A) Protect and transmit know how**
  - Form and hire young engineers-researchers and technicians (Sandwich-courses, PhD, Post-doc, CDD) → See Divisional report
- **B) Keep small innovative projects**
  - Redistribution of “margins”, small project programming and rationalisation, → See Divisional report
- **C) keep space for R&D**
  - Cf above + R&D calls and PhD program → See Divisional report
- **D) Tighten links with Paris-Saclay & education (Tech. PhD)**
  - Identification of training as an Irfu delivery, +LARSIM
  - Implication in management of Labex and Departments
- **E) Increase internal communication**
  - Inside each division → See Divisional report
  - At Irfu level (new info on Web, Gazette (2015), AG, visits, ...)
  - Meeting of the group/Lab leaders



# STRONG ENDORSEMENT OF IRFU PROJECT



**IRFU's scientific program for the next decade is rich and ambitious and is strongly endorsed by the committee.**

In particle physics, it is important to prepare a strategy for the large upgrades foreseen for LHC experiments around 2023 and to enable the necessary R&D. In astrophysics, the committee recommends to strengthen the involvement in the preparation of physics exploitation of the CTA project, in order to ensure a high scientific return when the instrument is operational. A clearer articulation between SAp and SPP on this project could probably help to achieve this goal. In Nuclear physics, one should remain vigilant to the impact of potential delays of the phase-2 of SPIRAL2 as aggressive developments are taking place at other facilities in the world. Finally, strong R&D on emerging magnets technology ( $MgB_2$  and HTS) is essential to keep the leadership in the superconducting magnets field.]

The committee notes the excellent organisation of the review and the strong mobilization of IRFU staff which allowed an in-depth visit of the institute including very interesting and informative discussions.



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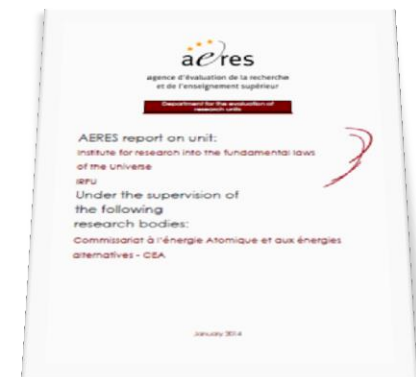
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- June 2014, publication of the AERES evaluation of Irfu

## ■ Step 4: Second semester of 2014, Irfu action plan

- Lesson learned from the AERES exercise
- AERES criticisms and recommendations
- CSI evaluation of the action plan in January 2015



ARRETE 2014 IRFU	Total dépenses	SUBV révisé	SUBV TGI + AE+ NRBC	Cessions négatives	Marges brutes	PL	Report	Total ressources	Solde
MAIN D'ŒUVRE Permanente (594.8 Etpt)	50 316	44 242	6 074					50 316	0
MAIN D'ŒUVRE non Permanente	5 327	0	289	368	550	4 120		5 327	0
MISSIONS	2 805	1 209	286	60	200	1 050		2 805	0
Investissement + Fonctionnement	30 830	7 066	7 429	5 296	4 463	7 893	5 772	37 919	7 089
<b>Total général</b>	<b>89 278</b>	<b>52 517</b>	<b>14 078</b>	<b>5 724</b>	<b>5 213</b>	<b>13 063</b>	<b>5 772</b>	<b>96 367</b>	<b>7 089</b>
<b>Solde TGI + AE</b>									<b>8 938</b>

BUDGET 2015 IRFU	Total dépenses	SUBV	SUBV TGI + AE+ NRBC (1)	Cessions négatives	Marges brutes	PL	Report	Total ressources	Solde
MAIN D'ŒUVRE Permanente (591 Etpt)	51 088	44 422	6 468	0	198			51 088	0
MAIN D'ŒUVRE non Permanente	4 381	0	117		550	3 715		4 382	1
MISSIONS	2 309	1 181	301	22	200	604		2 308	-1
Investissement + Fonctionnement	28 579	5 887	6 243	2 488	5 171	8 789		28 578	-1
<b>Total général</b>	<b>86 357</b>	<b>51 490</b>	<b>13 129</b>	<b>2 510</b>	<b>6 119</b>	<b>13 108</b>	<b>0</b>	<b>86 356</b>	<b>-2</b>

(1) Main d'œuvre ESS In kind en TGI - Investissement à 0

Mise en réserve soustraite

## Economies

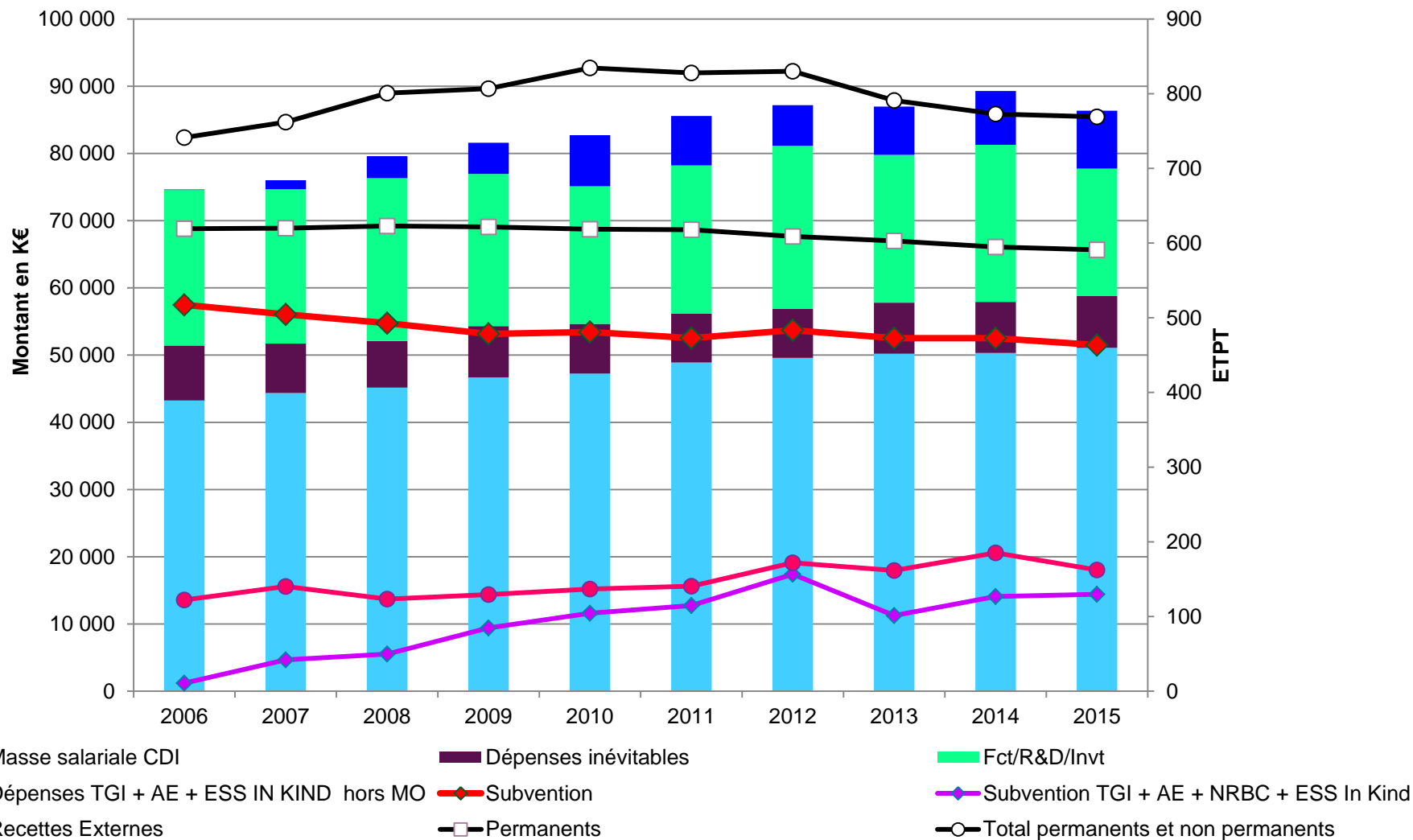
— Nature 30 LSM : -100 k€

## Augmentation Marges

	Marges Brutes 2014	
	Objectif Cible	
	<i>Etpt</i>	Montant
Programmes TGI (FAIR, XFEL, Spiral 2)	35,5	2 986
Approche Elargie	32,6	2 650
Programmes NRBC	0,9	74
Programmes Aimants Accélérateurs	37	3 704
<i>dt ESS contrats</i>	13	1 540
<i>dt Saraf</i>	3,5	550
Programmes Physique et détection	16,4	2 011
<b>Total</b>	<b>122,4</b>	<b>11 424</b>

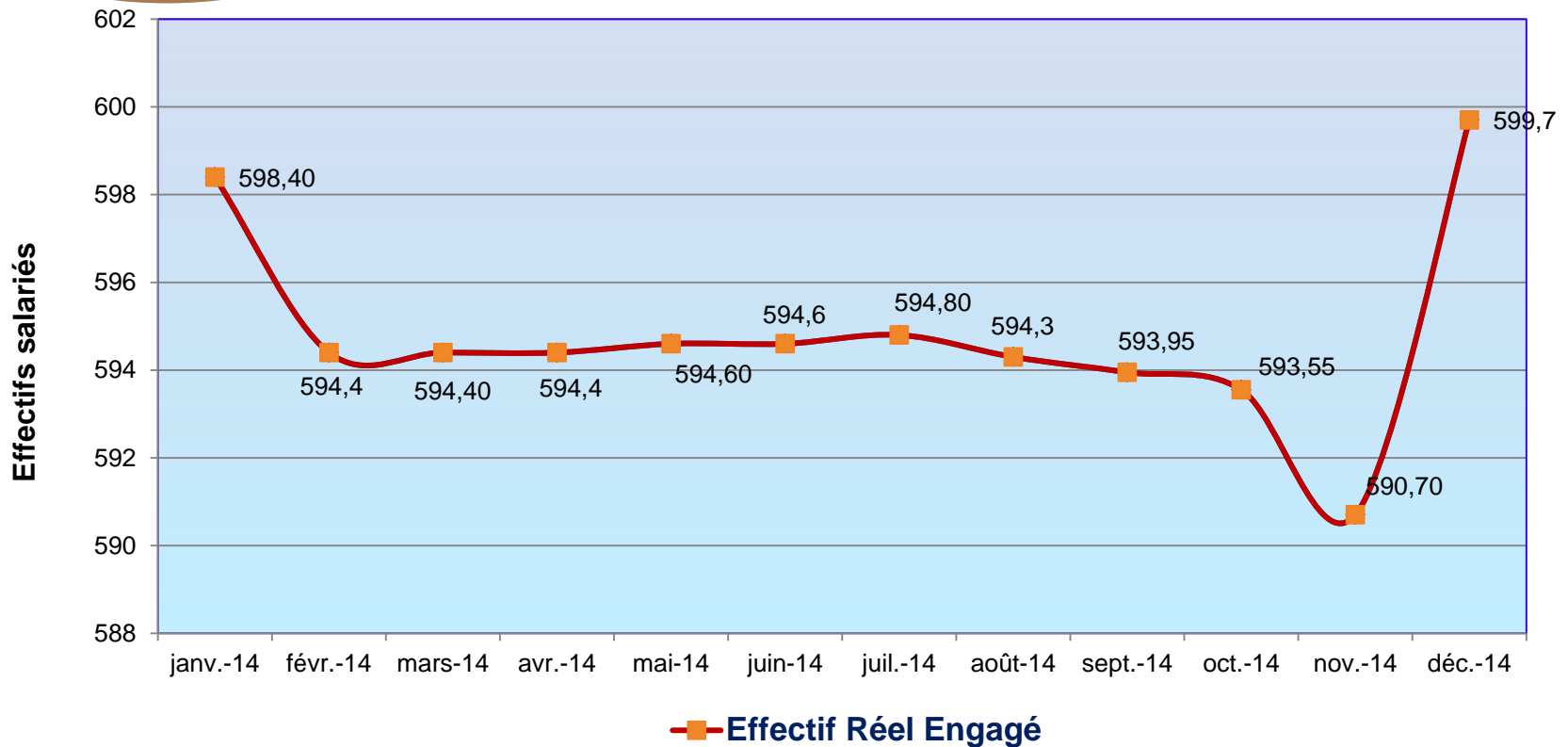
	Marges Brutes 2015	
	Objectif Cible	
	<i>Etpt</i>	Montant
Programmes TGI (FAIR, XFEL, Spiral 2)	42,7	3869
Approche Elargie	27	2579
Programmes NRBC	0,9	79,4
Programmes Aimants Accélérateurs	40,3	4593,4
<i>dt ESS Contrats</i>	4,9	594
<i>dt ESS In Kind</i>	11,3	1 569
<i>dt Saraf</i>	7,4	1 062
Programmes Physique et détection	9,8	1465,6
<b>Total</b>	<b>120,7</b>	<b>12 586</b>

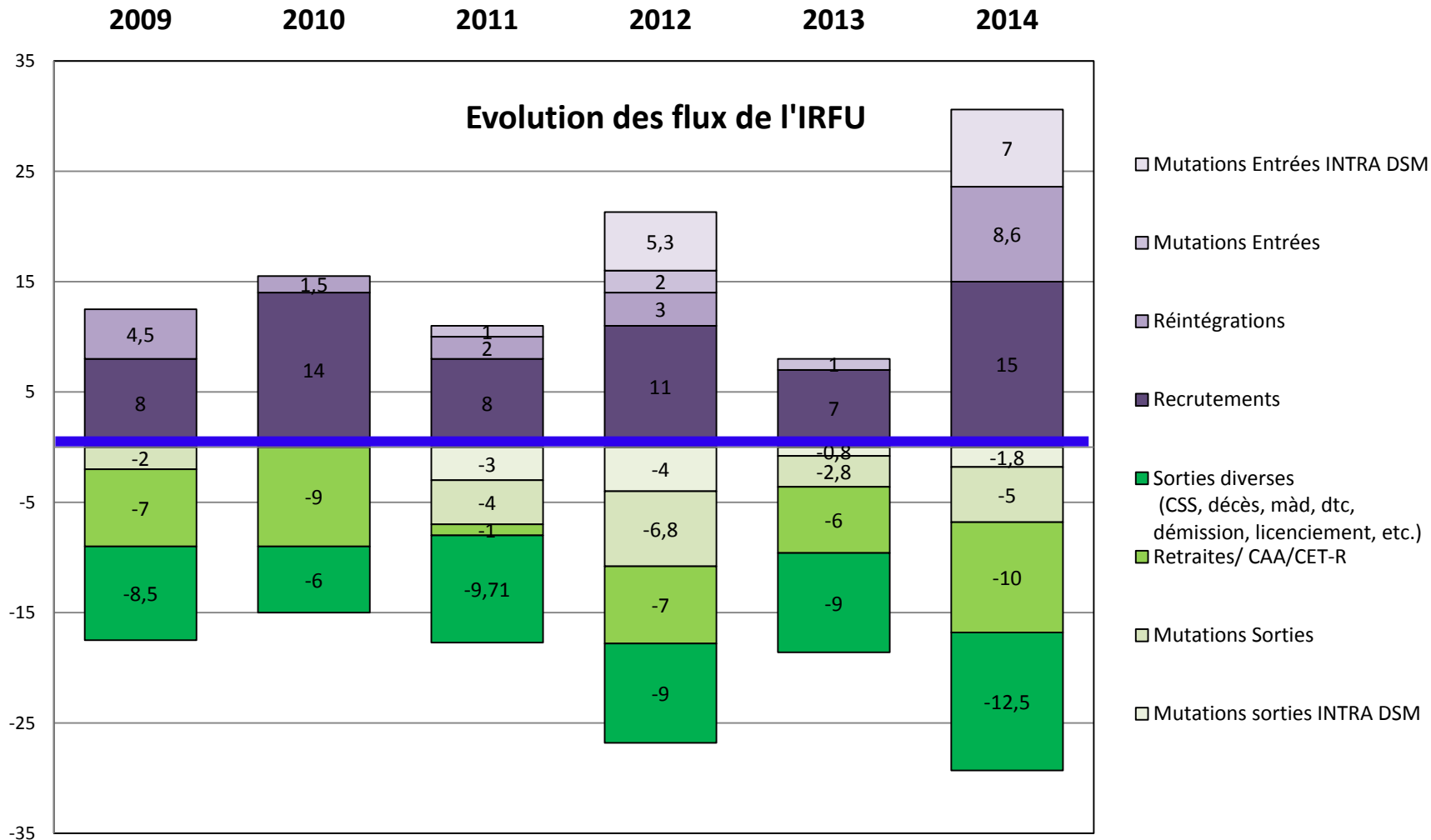
- Exercice 2014 à l'équilibre
- Report TGI



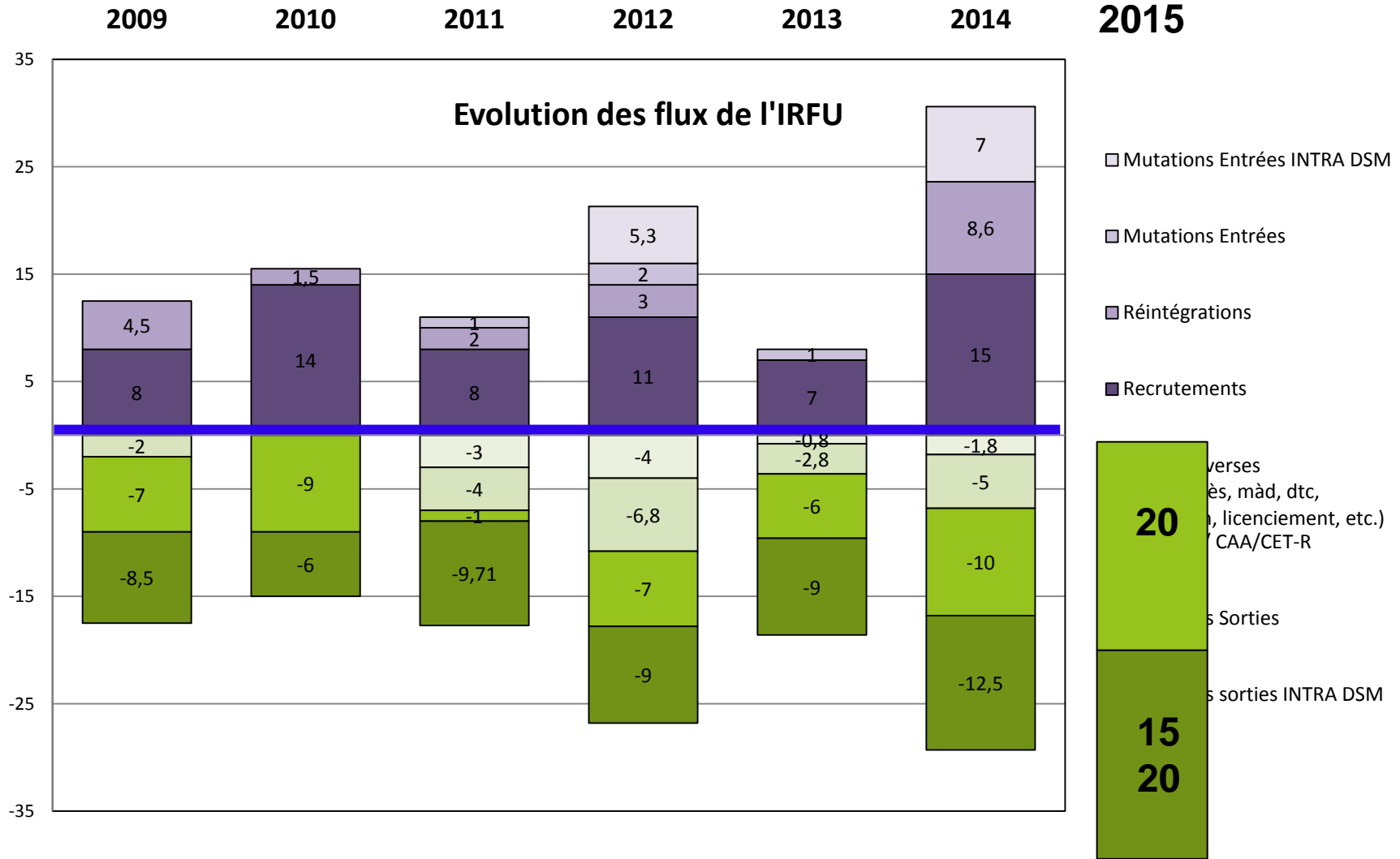
au 31/12/13 :  
598,37 ETP

**SITUATION AU 31/12/2014**  
Effectif Objectif 2014 : 593 ETP





○ Flux de sortie en croissance retraite et CSS (démissions).



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	PRIORITE IRFU	TYPE DE POSTE Remplacement / Création	INSTITUT	SERVICE	PROFIL DU POSTE	PROJETS / PROGRAMMES	CODE METIER/ SPECIALITE	DATE CIBLE
<b>ANTICIPATIONS PF DECEMBRE 2014</b>	1	Remplacement	IRFU	SACM	Physicien accélérateur	SARAF/ ESS/FCC	A112	<b>Déc. 2014</b>
	2	Création	IRFU	Sap	Adjoint au Chef de Service		K204	<b>Déc. 2014</b>
	3	Remplacement	IRFU	SIS	Ingénieur Alimentation de puissance	Stations d'essais Supratech, ESS	A612	<b>Déc. 2014</b>
	4	Remplacement	Irfu	SEDI	Ingénieur Microélectronique et banc de test microélectronique	CTA, CMS	A602	<b>Déc. 2014</b>
	5	Création	IRFU	SACM	Ingénieur Accélérateur spécialiste de vide	IFMIF/ESS/SARAF ...	A112	<b>Déc. 2014</b>
	6	Remplacement	Irfu	SIS /LEI	Ingénieur Electronicien	LNCMI, S3, Iter	A604	<b>Déc. 2014</b>
	7	Anticipation de remplacement	Irfu	SIS / LCAP	Ingénieur Calculs de structures	ESS,SARAF	A306	<b>Déc. 2014</b>

■ **7 Entrées anticipées** : Pérennisation de CDD sur postes clefs

	PRIORITE IRFU	TYPE DE POSTE Remplacement / Création	INSTITUT	SERVICE	PROFIL DU POSTE	PROJETS / PROGRAMMES	CODE METIER/ SPECIALITE
PRIORITES 2015 PHASE 1	1	Remplacement	IRFU	SACM	Technicien mesures physiques	projets aimants supraconducteurs, contrat CERN	A309
	2	Remplacement	Irfu	SEDI	Technicien pilotage équipes AIV	ATLAS NSW	A302
	3	Création	Irfu	SPhN	Expérimentateur en physique hadronique (analyse des données de Jlab)	Jlab, CLAS12	A103
	4	remplacement	Irfu	SPP	chercheur ingénieur	ATLAS ERC Boonekamp	A104
	5	Remplacement	IRFU	SACM	Technicien RF instrumentation électronique	plate forme d'essais SupraTech, antennes Iseult, ESS, SARAF....	A614
	6	Remplacement	IRFU	DIR	Qualité Sécurité Environnement		F104
	7	Remplacement	IRFU	SACM	Ingénieur magnétisme, supraconductivité	Accords CERN	A301
	8	Remplacement	IRFU	SAP	Ingénieur Architecte Electronique Spatiale	Euclid; SVOM; PLATO; Athena ; M4	A603
	9	Remplacement	Irfu	SEDI	Technicien cryogénie et vide	DESI, cfutures caméra CCDs	A309
	10	Anticipation de remplacement	Irfu	SIS /LCAP	Ingénieur d'études mécanique / thermique	ESS, SARAF	A306
	11	Remplacement	IRFU	SACM	Ingénieur cryomodule	ESS/SARAF...	A112

## ■ 11 Entrées en phase 1 :

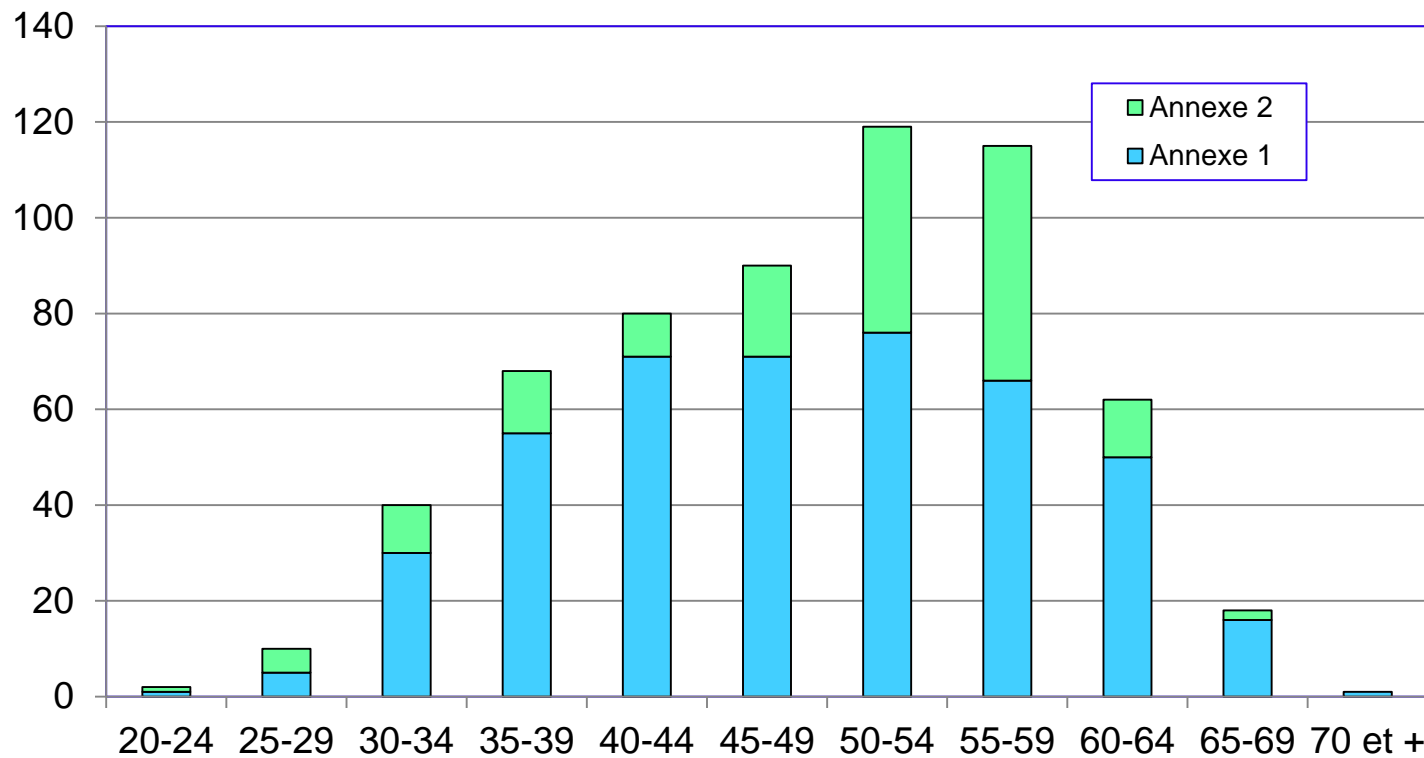
- Postes clef sur projets Clef
- 2 Postes de physicien (décroissance SPhN et SPP, engagement AG)

	PRIORITE IRFU	TYPE DE POSTE Remplacement / Création	INSTITUT	SERVICE	PROFIL DU POSTE	PROJETS / PROGRAMMES	CODE METIER/SPECIALITE
	12	Remplacement	Irfu	SIS / LCAP	Projeteur mécanique	ESS, SARAF	A306
	13	Remplacement	IRFU	SACM	Technicien bobinage	aimants supraconducteurs, HE/LHC et supra HTC	A308
	14	Création	IRFU	SAP	ingénieur Spécialiste détecteur IR	Euclid; ELT-METIS; Labex FOCUS; plateforme caractérisation détecteurs spatiaux; lien LETI	E104
	15	Remplacement	Irfu	SEDI	Ingénieur sécurité + gestionnaire sources	Sécurité installations	F104
	16	Remplacement	IRFU	SACM	Technicien mesures physiques et mécanique	Injecteurs et RFQ IPHI/ESS/SARAF	A112
	17	Remplacement	Irfu	SIS / LDISC	Ingénieur développement logiciel	SVOM, ESS, SARAF, Supratech, ...	C207

## ■ 8 à 12 Entrées en phase 2 lancée au T2 :

- Nombre à revoir suivant départs et budget
- Profils à revoir suivant départs et priorités de remplacement induites

- Pyramide des âges → départs en retraite croissant
- Distribution A2 fortement piquée
  - Importants départs prévus dans les prochaines années
  - Plan de maintien des compétences





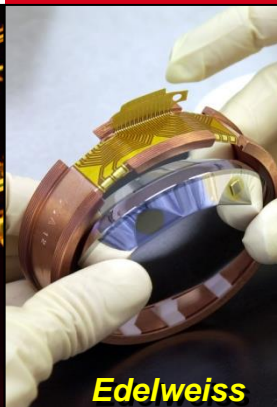
**Irfu**



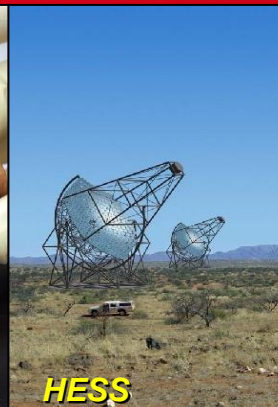
**Double Chooz**



**ALICE**



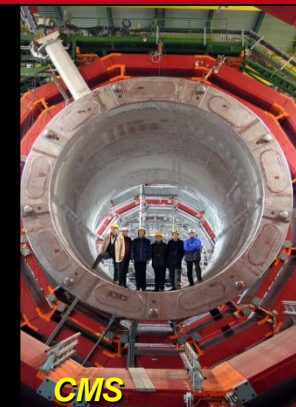
**Edelweiss**



**HESS**



**Herschel**



**CMS**

*Interpreting radiations from the Universe.*

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