SPIRAL 2 phase 1+/DESIR

Laurent Serani

On behalf of SFRE

Outline

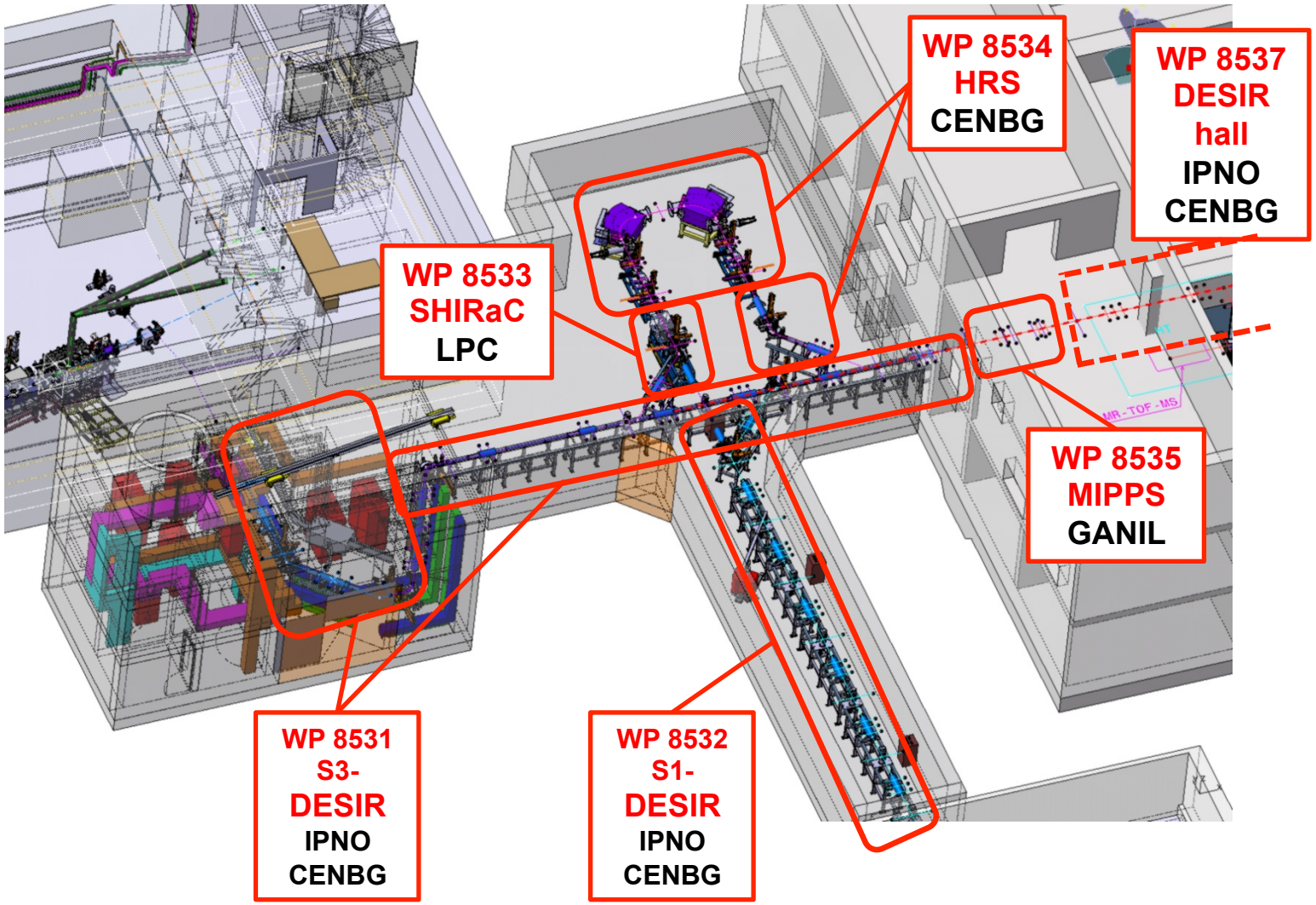
- ***Perimeter of PHASE1+***
- *Development program*
- *Status of Design of equipment*
- *Status of building definition*
- *Time schedule*

Perimeter of SPIRAL2 / phase1+

- **Incorporation of DESIR in the SPIRAL2 Phase 1 project as a "+" and delay in the construction of SPIRAL2 Phase 2**
  - **DESIR EQUIPEX embedded in the SFRE group:**
    - ✓ **Building & beam lines work packages managed by SFRE (Tech. coord.)**
  - **Integration of the purification tool (RFQ-SHIRaC2&HRS) in the beam transport tunnels**
  - **New specifications of the DESIR hall to reduce costs (Dec 2013)**

Perimeter of Phase 1+

Beam lines : WBS



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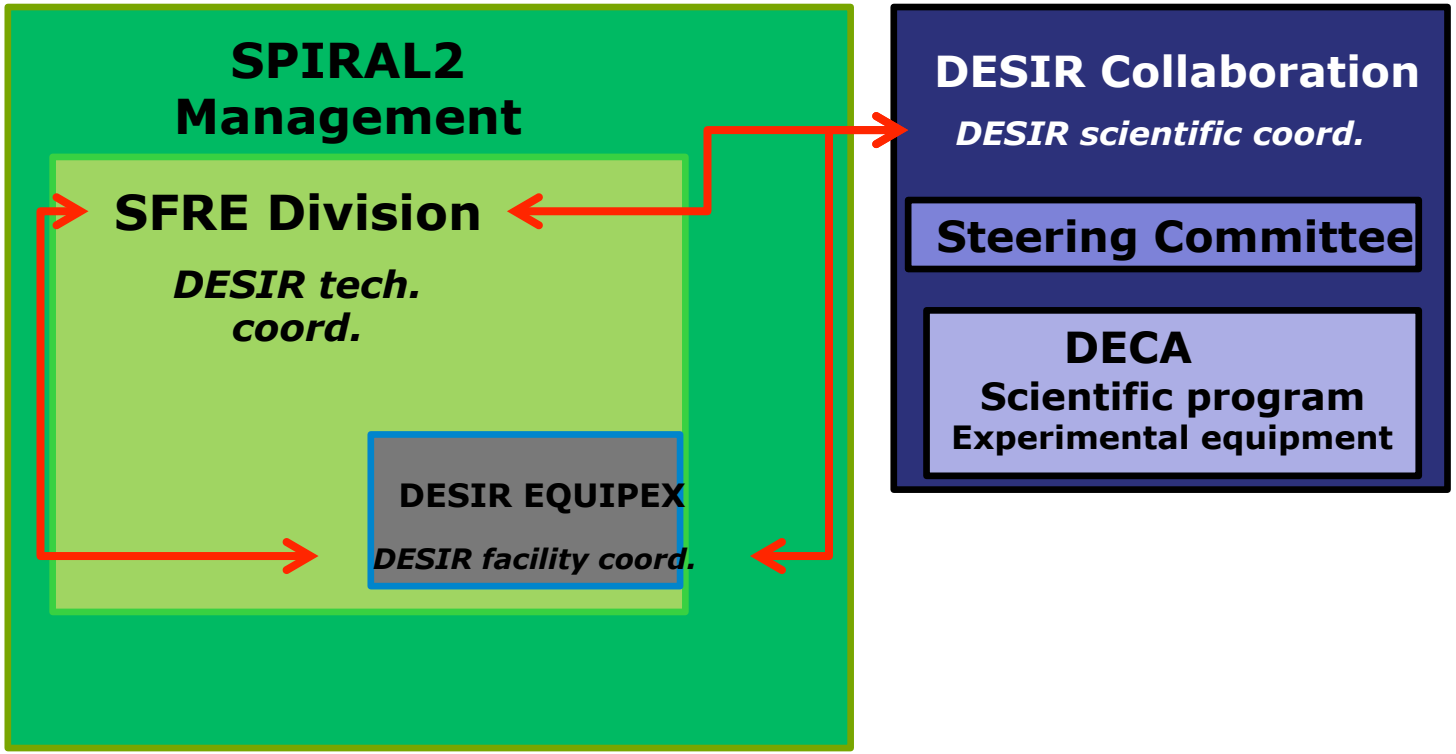
Development plan

- Organisation



French Partners: IPNO - Optics design and mechanical design
- In charge of the coordination of beam line production

CENBG - Control system - HRS

LPC - RFQ-SHIRaC

International partners: BARC-India- part of beam line construction - under discussion

Development plan

Operational chart for SP2 / SFRE / ph.1+

Responsable / Resp. adj : F.Varenne / L.Serani

- Beam Transp. Coord. : H.Franberg
- System Engeneering : F.Varenne (equipment) / L.Serani (transverse)

Pilotage SFRE	Ingénierie système						Procédé Transport faisceaux																													
Responsable de section	Architecte Procédé			Architecte Système			Coordonateur transport faisceau																													
F. Varenne (SPIRAL2)	F.Varenne (SPIRAL2)			L. Serani (SPIRAL2)			H.Franberg (SPIRAL2)																													
LDM_FR_1.0	LDM_FR_2.0			LDM_FR_3.0			LDM_FR_6.0																													
Responsable de section adjoint	Ingénierie procédé			Ingénierie transverse			Lot 1 a (8531) Ligne jonction S3-DESIR			Lot 1 b (8532) Ligne jonction SPIRAL-DESIR			Lot 2 (8537) Lignes de distribution hall DESIR			Lot 3 a (8533, 8332) RFQ-Cooler			Lot 3 b (8534, 8333) Spectromètre haute résolution			Lot 4 (8535) MIPPS												
L. Serani (SPIRAL2)	Intégrateur procédé	C.Michel (STP/GBE)	FDT_FR_2.1	Intégrateur servitudes	? (GANIL)	FDT_FR_3.1	Responsable du lot	L.Perrot (IPNO)	FDT_FR_6.10	Responsable du lot	L.Perrot (IPNO)	FDT_FR_6.20	Responsable du lot	L.Perrot (IPNO)	FDT_FR_6.30	Responsable du lot	J.F. Cam (LPC)	FDT_FR_6.40	Responsable du lot	L.Serani (CENBG)	FDT_FR_6.50	Responsable du lot	? (GANIL)	FDT_FR_6.60										
LDM_FR_1.1	Référent mécanique	C.Barthe-Dejean (GANIL)	FDT_FR_2.2	Resp. liaisons servitudes	? (GANIL)	FDT_FR_3.2	Resp. dynamique faisceau	L.Perrot (IPNO)	FDT_FR_6.11	Resp. dynamique faisceau	L.Perrot (IPNO)	FDT_FR_6.21	Resp. dynamique faisceau	L.Perrot (IPNO)	FDT_FR_6.31	Resp. dynamique faisceau	G. Ban (LPC)	FDT_FR_6.41	Resp. dynamique faisceau	T. Kurtukian-Nieto (CENBG)	FDT_FR_6.51	Resp. étude de faisabilité	JC.Thomas /?/ (GANIL/PHYS)	FDT_FR_6.61										
	Interlocuteur tech. Collab. DESIR	L.Serani (GANIL)	FDT_FR_2.3	Resp. composants ctrl-cmd	L.Daudin (CENBG)	FDT_FR_3.3	Resp. étude et intégration mécanique	P. Blache (IPNO)	FDT_FR_6.12	Resp. étude et intégration mécanique	P. Blache (IPNO)	FDT_FR_6.22	Resp. étude et intégration mécanique	P. Blache (IPNO)	FDT_FR_6.32	Resp. étude et intégration mécanique	J. Lory (LPC)	FDT_FR_6.42	Resp. étude et intégration mécanique	F. Delalée (CENBG)	FDT_FR_6.52	Resp. dynamique faisceau	?	FDT_FR_6.62										
	Resp. installation procédé	? (GANIL)	FDT_FR_2.4	Resp. programmation ctrl-cmd	L.Daudin (CENBG)	FDT_FR_3.4	Resp. spécifications transverses	?	FDT_FR_6.13	Resp. spécifications transverses	?	FDT_FR_6.23	Resp. spécifications transverses	?	FDT_FR_6.33	Resp. spécifications transverses	C.Vandamme (LPC)	FDT_FR_6.43	Resp. spécifications transverses	L.Serani (CENBG)	FDT_FR_6.53	Resp. étude et intégration mécanique	?	FDT_FR_6.63										
	Resp. MES procédé TF	? (GANIL)	FDT_FR_2.5	Resp. MES ctrl-cmd	L.Daudin (CENBG)	FDT_FR_3.5	Resp. réalisation mécanique	P. Blache (IPNO)	FDT_FR_6.14	Resp. réalisation mécanique	P. Blache (IPNO)	FDT_FR_6.24	Resp. réalisation mécanique	P. Blache (IPNO)	FDT_FR_6.34	Resp. plateforme HT	J.Brégeault (LPC)	FDT_FR_6.44	Resp. réalisation	F.Delalée (CENBG)	FDT_FR_6.54	Resp. réalisation mécanique	?	FDT_FR_6.64										
	Resp. diag. Faisceau	C.Jamet (GANIL)	FDT_FR_2.6	Resp. composants automatismes	P.Alfaurt (CENBG)	FDT_FR_3.6	Resp. assemblage et installation	?	FDT_FR_6.15	Resp. assemblage et installation	?	FDT_FR_6.25	Resp. assemblage et installation	?	FDT_FR_6.35	Resp. système RF	J.F. Cam (LPC)	FDT_FR_6.45	Resp. assemblage et installation CENBG	F. Delalée (CENBG)	FDT_FR_6.55	Resp. réalisation détecteur	?	FDT_FR_6.65										
	Resp. fourniture diag. mes. intensité	C.Jamet /?/ (GANIL)	FDT_FR_2.7	Resp. programmation automatismes	P.Alfaurt (CENBG)	FDT_FR_3.7	Resp. qualification sous faisceau	?	FDT_FR_6.16	Resp. qualification sous faisceau	?	FDT_FR_6.26	Resp. qualification sous faisceau	?	FDT_FR_6.36	Resp. gaz et vide	Ch. Vandamme (LPC)	FDT_FR_6.46	Resp. qualification sous faisceau CENBG	T. Kurtukian-Nieto (CENBG)	FDT_FR_6.56	resp. assemblage et installation	?	FDT_FR_6.66										
	Resp. fourniture diag. mes. profil EMS	E.Guerouit (GANIL)	FDT_FR_2.8	Resp. MES automatismes	P. Alfaurt (CENBG)	FDT_FR_3.8										Resp. réalisation mécanique	J. Lory (LPC)	FDT_FR_6.47	Resp. assemblage et installation GANIL	F. Delalée (CENBG)	FDT_FR_6.57	resp. qualification sous faisceau	?	FDT_FR_6.67										
	Resp. fourniture diag. mes. profil PFE	JL.Vignet (GANIL)	FDT_FR_2.9	Responsable définition et fourniture alimentations	? (CENBG)	FDT_FR_3.9										Resp. assemblage et installation	G. Ban (LPC)	FDT_FR_6.48	Resp. qualification sous faisceau GANIL	T. Kurtukian-Nieto (CENBG)	FDT_FR_6.58										
	Resp. fourniture diag. mes. profil PTFI	JM.Fontbonne (LPC Caen)	FDT_FR_2.10	Resp. MES alimentations	? (CENBG)	FDT_FR_3.10										Resp. qualification sous faisceau	G. Ban (LPC)	FDT_FR_6.49																
	Resp. définition fourniture et MES aimants	MH.Stodel (SPIRAL2)	FDT_FR_2.11	Resp. définition et fourniture syst. pompage	? (CENBG)	FDT_FR_3.11																												
	Resp. définition fourniture et MES snd. RMN	A.Lemarié (GANIL)	FDT_FR_2.12	Resp. MES syst. pompage	? (CENBG)	FDT_FR_3.12																												
	Resp. mesures magnétiques aimants	A.Lemarié (GANIL)	FDT_FR_2.13	Resp. Alignement	A. Lefebvre (GANIL / STP)	FDT_FR_3.13																												

Interface transverse projet SPIRAL2

Interface group system / AMOA : System Engeneering phase 1+ (SYS)

Interface group SRE : Resp. Nuclear safety ph.1+ (SRE)

Interface building / MOE : Building construction Engeneer (BIS)

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Status of equipment design
Beam lines

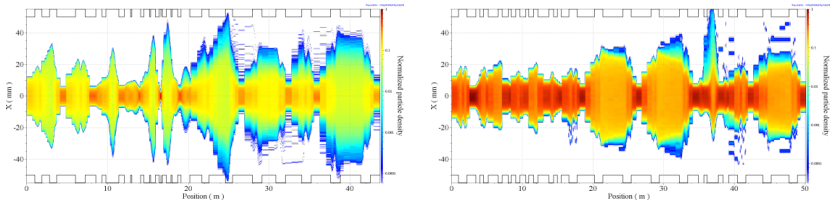
Main caracteristics

- **electrostatic lines, point-to-point transport**
- **beams of 10-60 keV, 3-80 π.mm.mrad (2 RMS)**
- **S3-LEB->DESIR: 44 m, 2 levels**
- **SPIRAL1 -> DESIR: 50 m, 1 level**

- Revue of Preliminary Optical Design made on last September.
- Consolidation will be made until March
- Start of detailed design phase

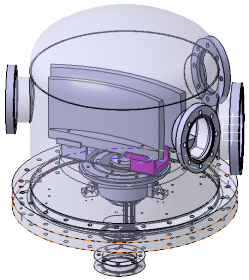
Beam envelop simulations – IPN Orsay

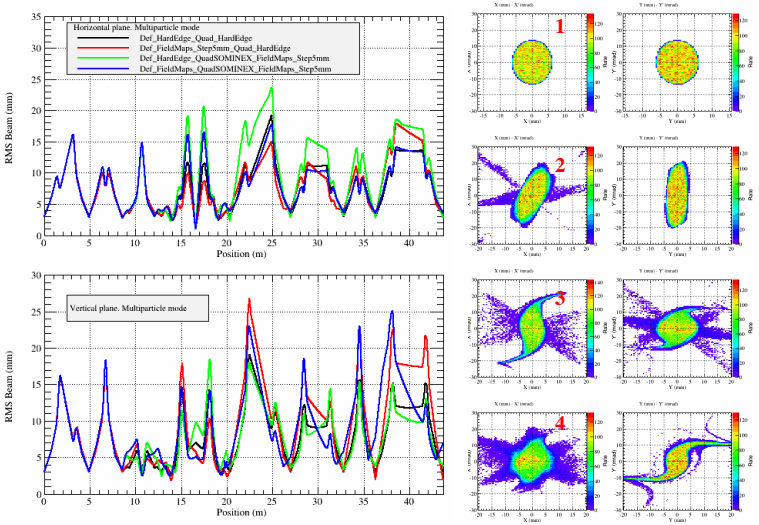
$^{122}Sn^{1+}$ @ 60 keV – 80 π.mm.mrad



S³-LEB -> DESIR (44 m) **SPIRAL1 -> DESIR (50 m)**

Prototype of a quad triplet + steerer section **Design of a 45° deflector**





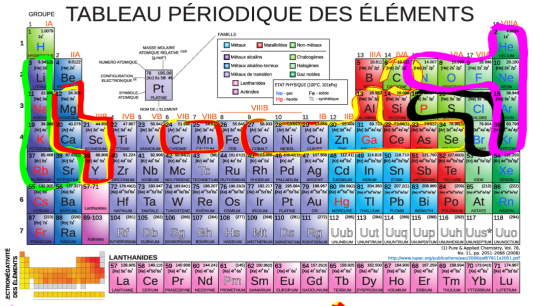
Courtesy of L. Perrot IPNO

Status of equipment design-Production site

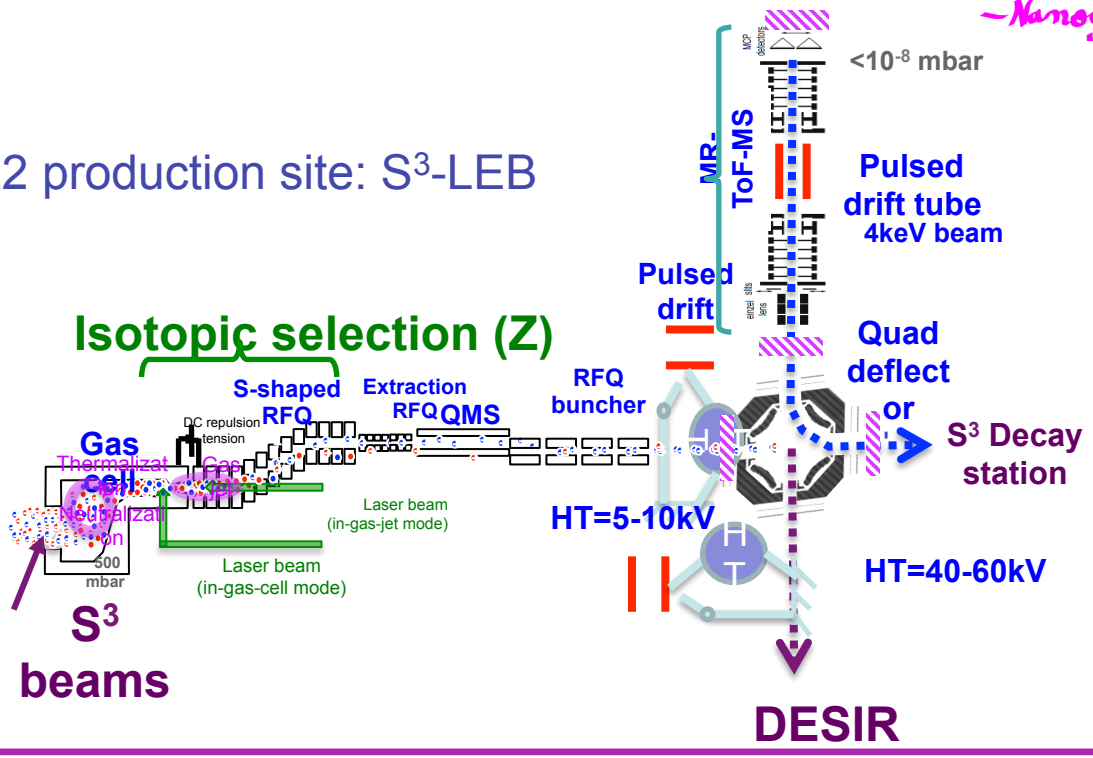
- Objective: take care of optical interface according building design and transportation with as low as possible lose of RIB

- GANIL production site: SPIRAL1 upgrade

ECR: Ne, Ar, Kr, N, O, F
Surface Ionization : Li, Na, K, Rb
FEBIAD: Mg, Al, P, S, Cl, Fe, Cu

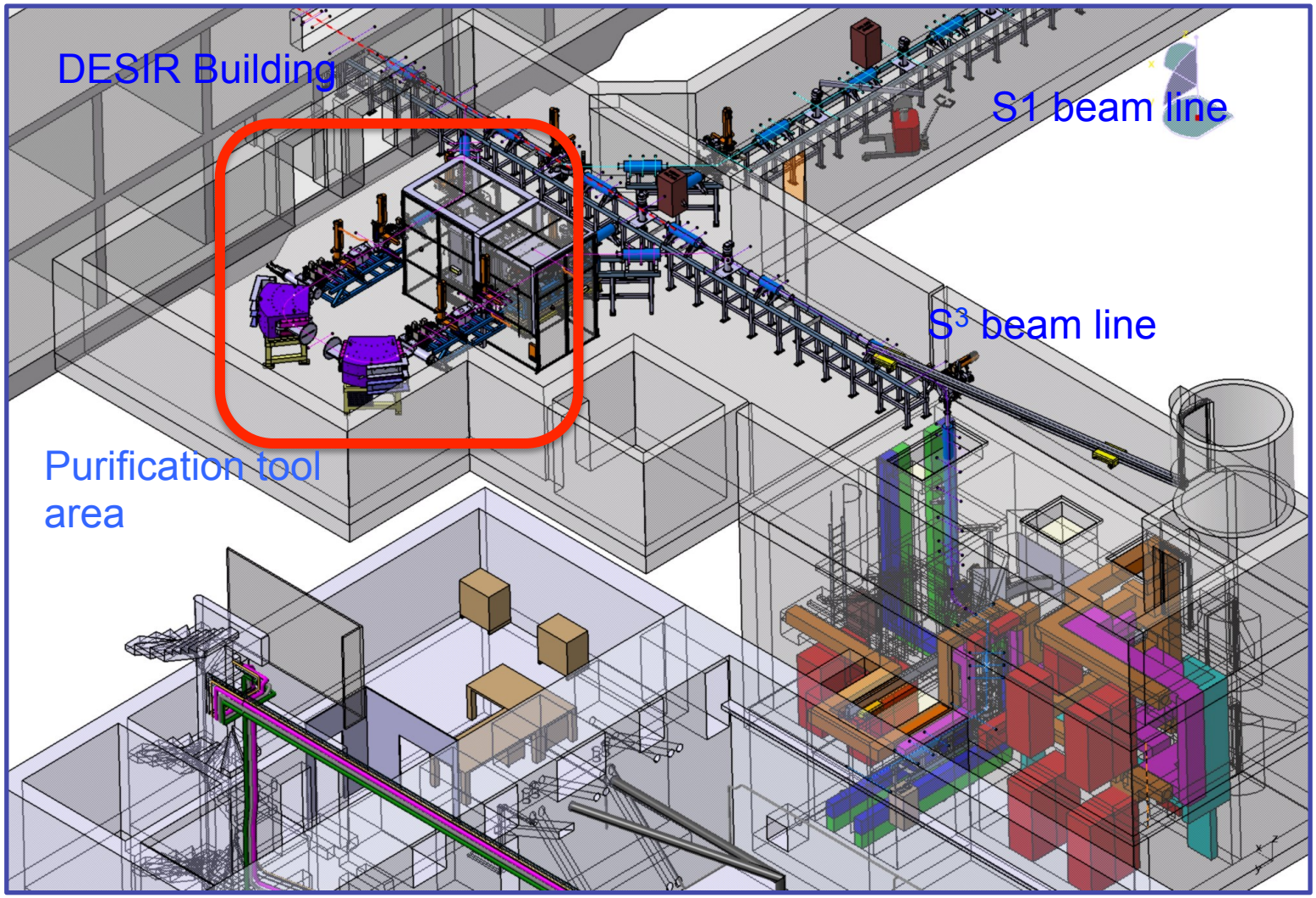


- SPIRAL2 production site: S³-LEB



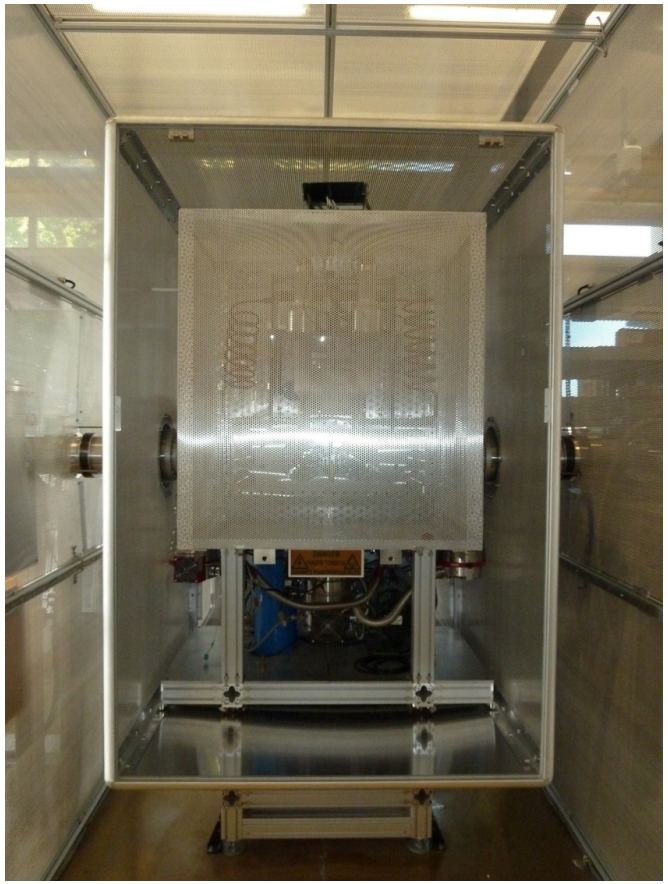
Courtesy of B. Bastin
Courtesy of P. Delahaye

Status of equipment design
Purification tool



Status of equipment design
RFQ-SHIRaC2

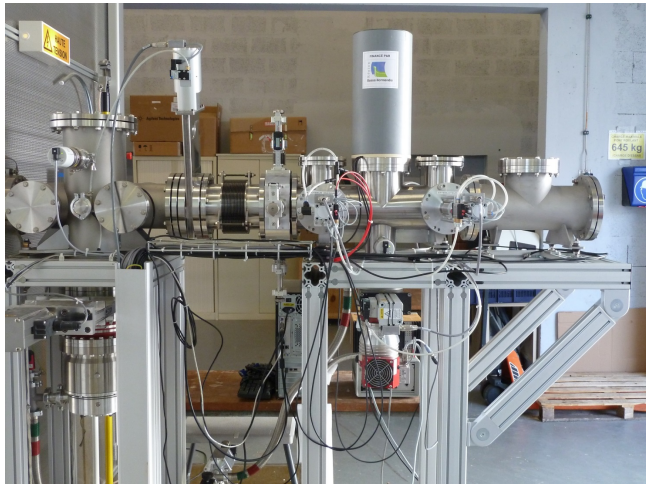
- RFQ- SHIRAC2



New design of CEM shielding for 60 kV

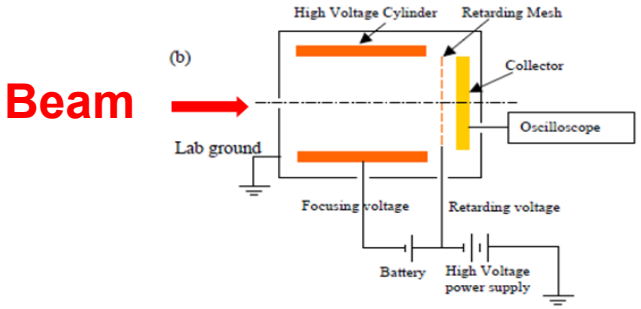
To be done:
- New design of a « ALARA » vacuum chamber
- Continue performance test

New diagnostics set-up

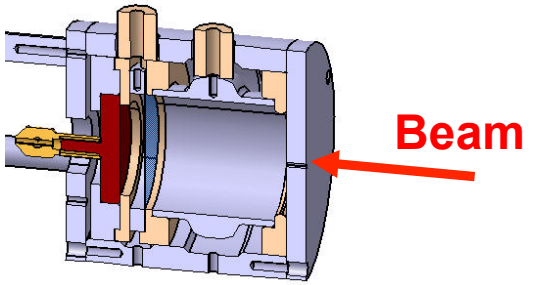


Status of equipment design
RFQ-SHIRaC2

- RFQ- SHIRaC2
  - Latest development
    - ***Energy spread measurement with a new detector.*** ***Goal:*** **Better sensitivity**



Detector principle



Detector

Results

Specification for HRS
- energy spread of 1eV

Ion beam intensity (nA)	Transmission (%)	sigmaE of longitudinal energy spread (eV)
50	67	0.7
500	60	1
1000	54	1.1

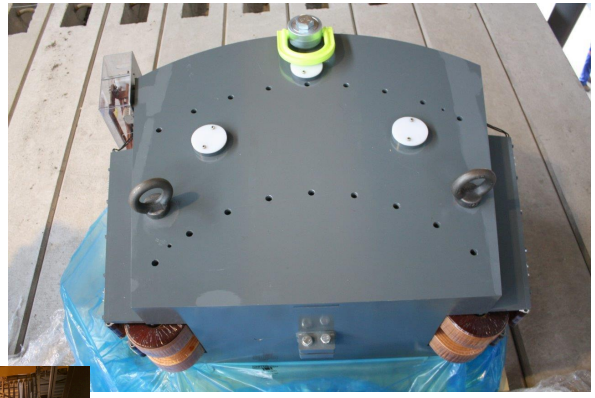
sensitivity~0.6eV

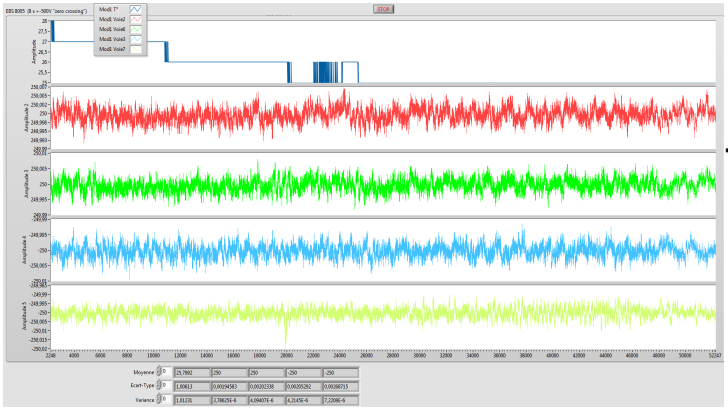
Status of equipment design

HRS

- HRS-Construction phase
  - *More or less 50% of investment are done*

HRS Magnets delivered to GANIL last July

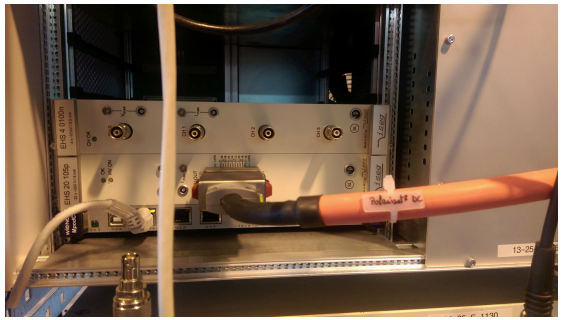




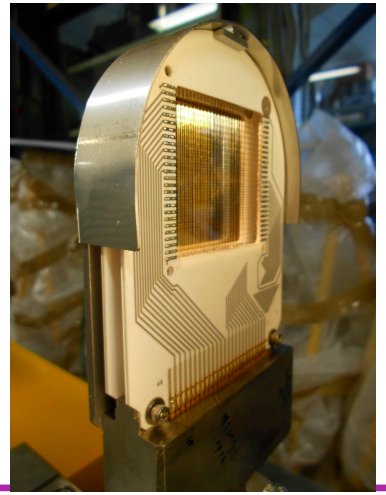
¨Pumping system

Integration and test of an EMS SP2 at Bordeaux

HV power supply
Stability of 2. 10^{-5}
Vnom



PLC system



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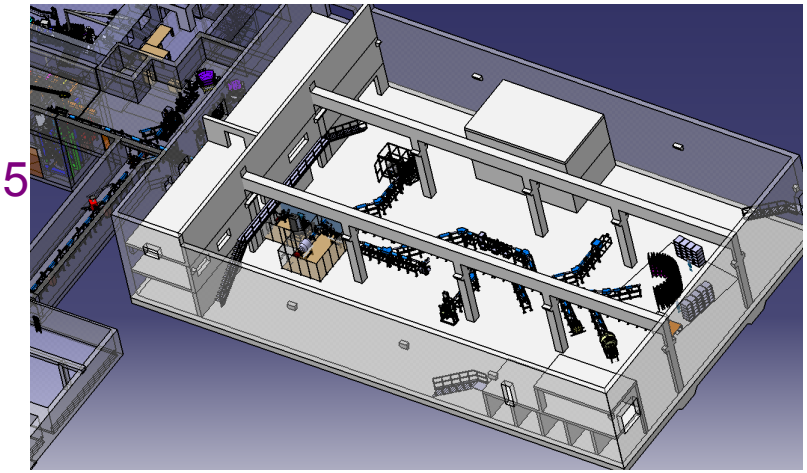
Status of Building Definition

December 2013 – Modification of DESIR building Program
June 2014 – 2D plans produce by INGEROP
June/September 2014 – Analyse of propositions
October 2014 – executive summary by the SFRE and DESIR collaboration

- **supplies, technical rooms, accesses**
- **building infrastructure: pillars?**
- **equipment handling (cranes)**

	Note technique	SP2_NT_8300_I038878_V0.3
	Synthèse d'analyse de l'esquisse des bâtiments phase 1+ (DESIR)	Date de création : 01/09/2014
		Page 1 sur 20

Expected: Beginning of APS Phase in January 2015



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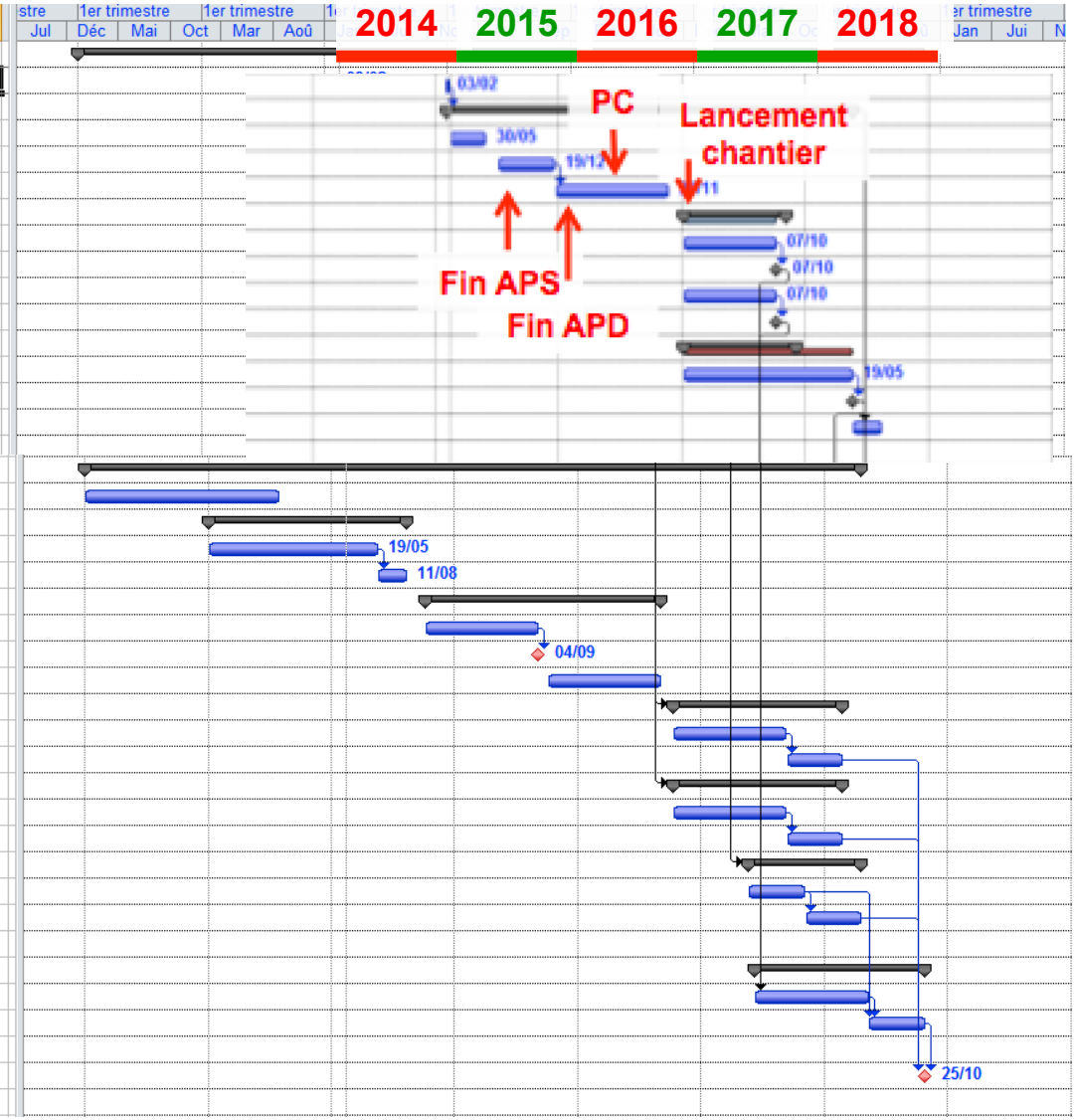
Time Schedule

	Nom de la tâche
1	**Planning DESIR**
2	**SPIRAL2 Phase1+: T0 construction**
3	**DESIR buildings construction**
4	APS
5	APD
6	DCE + AO + Passation Contrat
7	**DESIR beam transport tunnels**
8	**S3 -> DESIR: tunnel construction**
9	Disponibilité pour l'installation des servitudes et du process S3->DESIR
10	**S1-> DESIR: tunnel construction**
11	Disponibilité pour l'installation des servitudes et du process S1->DESIR
12	**DESIR experimental hall**
13	**Construction of the building**
14	Disponibilité pour l'installation des servitudes et du process S1->DESIR
15	**Delivery and tests of the SPIRAL2 Phase 2 buildings**
16	
17	**DESIR beam lines**
18	**Specifications (finalisation études optique)**
19	**Sections proto**
20	**Construction of the prototype equipments : triplet**
21	**ReX**
22	**Purchase and construction of the beam line equipment**
23	**APD**
24	Revue de conception
25	**Fabrication des équipements des lignes**
26	**S3 -> DESIR beam lines**
27	**Installation**
28	**Commissioning**
29	**S1->DESIR beam line**
30	**Installation**
31	**Commissioning**
32	**DESIR hall beam line**
33	**Installation**
34	**Commissioning**
35	
36	**DESIR hall experimental equipment**
37	**Installation**
38	**Commissioning**
39	
40	**Operation of the DESIR facility**



Thank you for listening