GANIL/SPIRAL2 in the EURISOL DF

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GANIL

CEA/DSM-CNRS/IN2P3, Caen, France

- *High intensity accelerator*
- *Handling of the high radioactivity and maintenance*
- *High-power converter and big volume UCx target*
- *Very high intensity RIB*
- *Innovative Instrumentation*

www.ganil-spiral2.eu

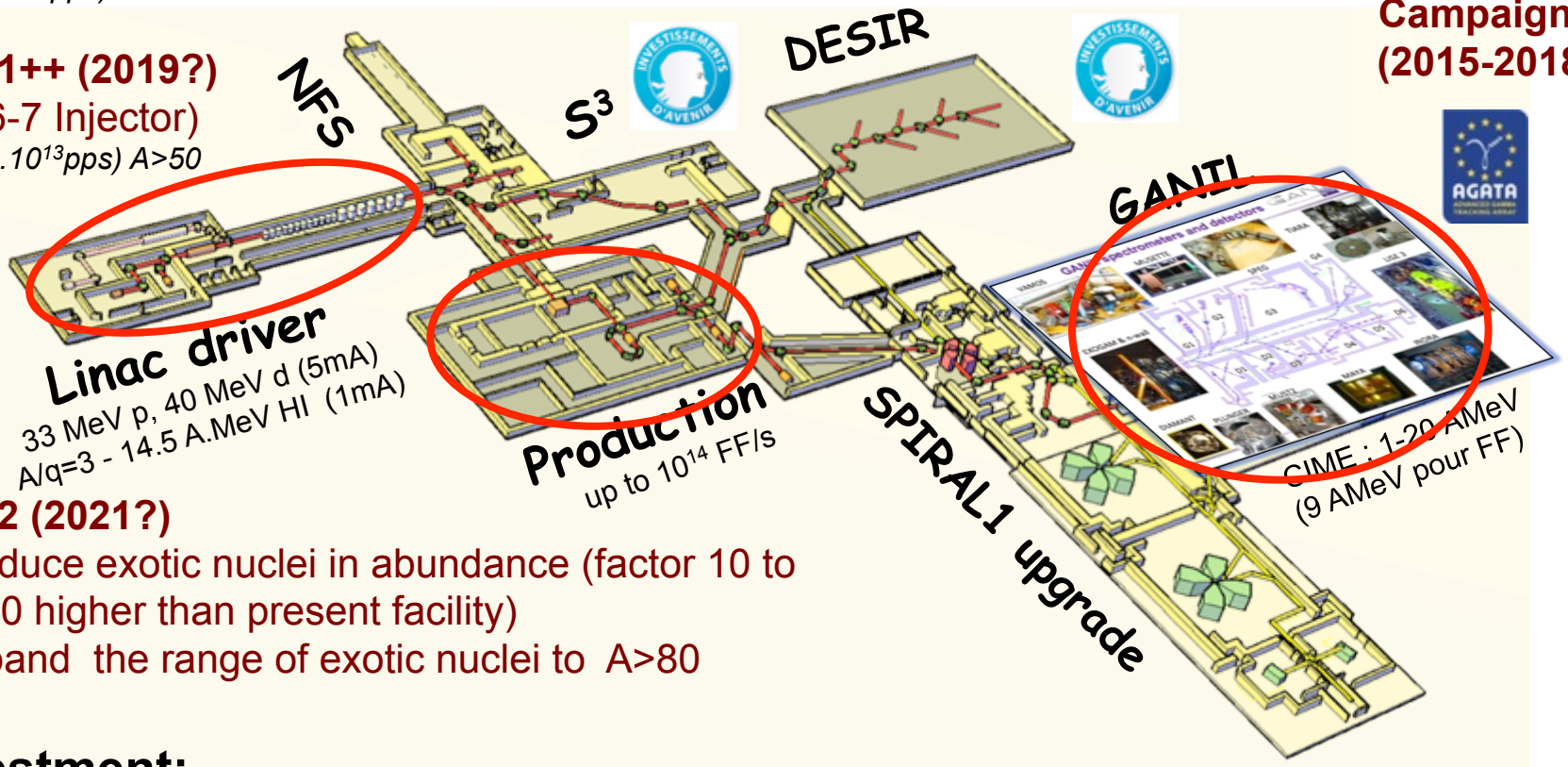
A National & EU priority

Phase1 (2015)
Increase the intensity of stable beams by a factor 10 to 100 – High intense neutron source
10pμA (6.10¹³pps) A<50

Phase1++ (2019?)
(A/Q=6-7 Injector)
10pμA (6.10¹³pps) A>50

DESIR Phase1+ (2019)
(low energy facility)

AGATA Campaigns (2015-2018)



Phase2 (2021?)
- Produce exotic nuclei in abundance (factor 10 to 1000 higher than present facility)
- Expand the range of exotic nuclei to A>80

SPIRAL1 Upgrade (2016)
New light RIBs

Investment:

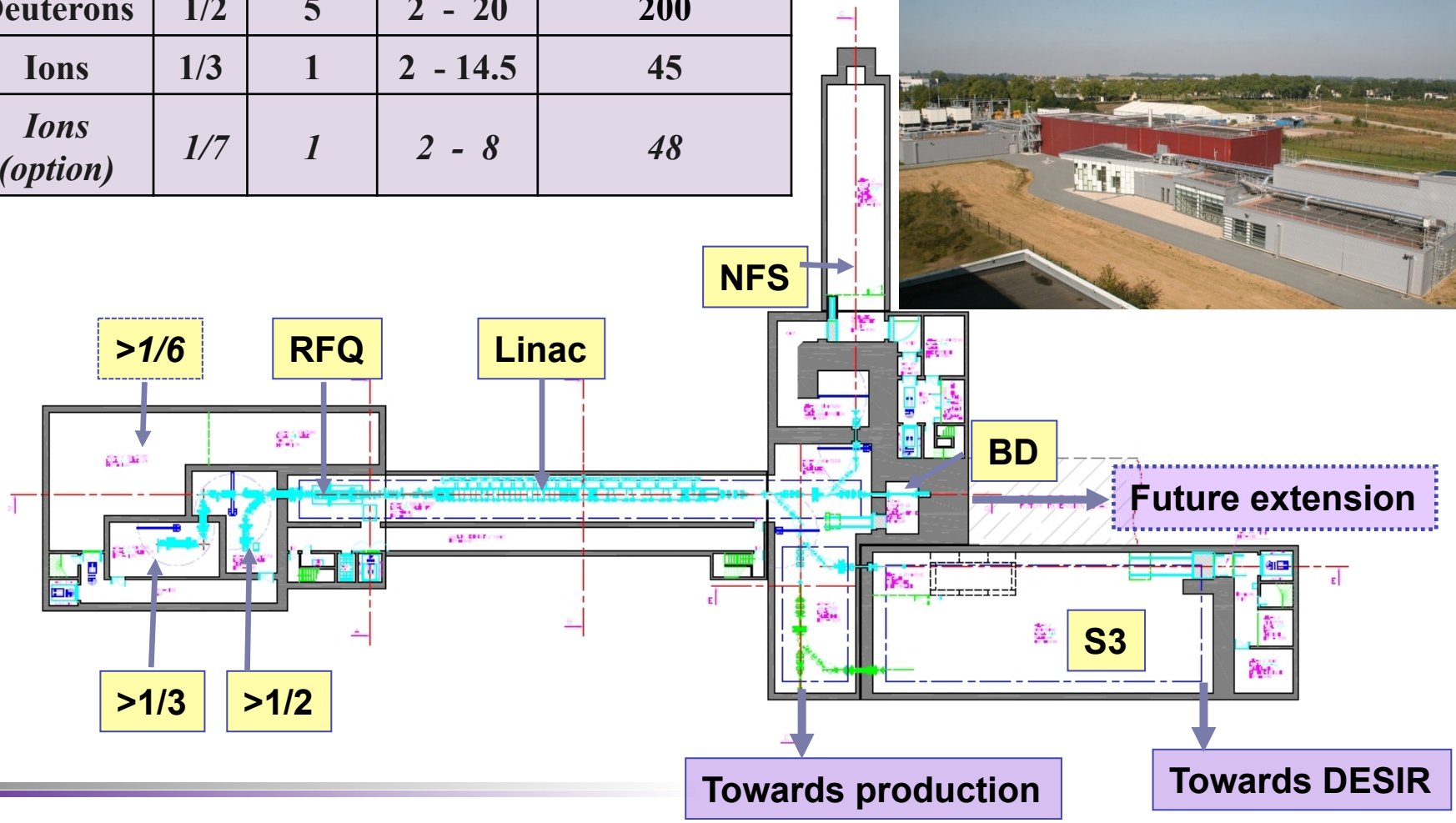
- **GANIL >500 M€ (estimation 2012)**
- **SPIRAL2 Phase 1&2 (2014): 210 M€**
- **New exp. halls and detectors ≥23 M€**

SPIRAL2 is on the list of the European Strategy Forum on Research Infrastructures (ESFRI)

High intensity accelerator

	Q/A	I (mA)	Energy (Mev/u)	Max beam Power (KW)
Protons	1/1	5	2 - 33	165
Deuterons	1/2	5	2 - 20	200
Ions	1/3	1	2 - 14.5	45
Ions (option)	*1/7*	*1*	*2 - 8*	*48*

Average beam intensity equivalent to that of ESS or EURISOL driver



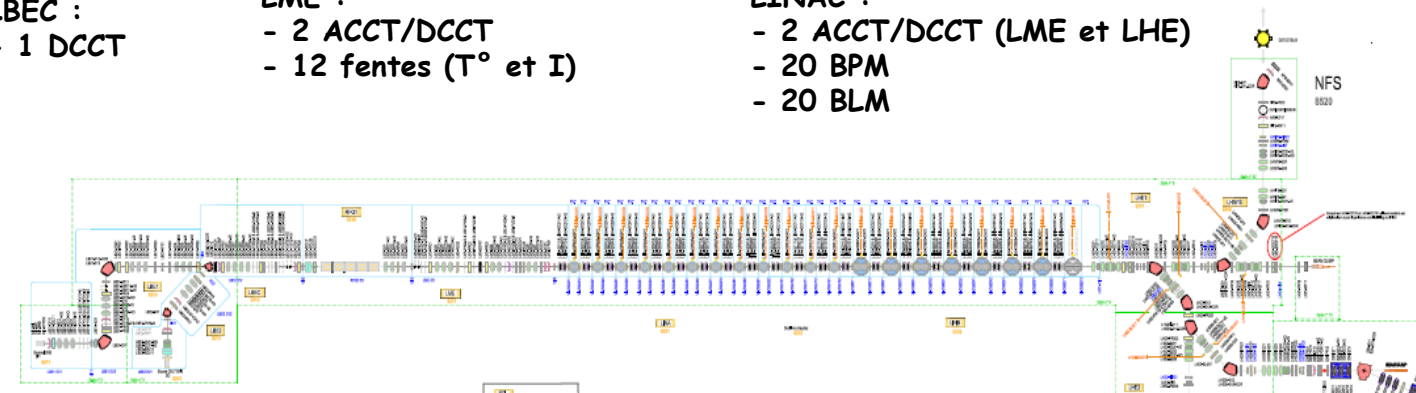
High intensity accelerator
Accelerator (target, spectrometers) Protection System

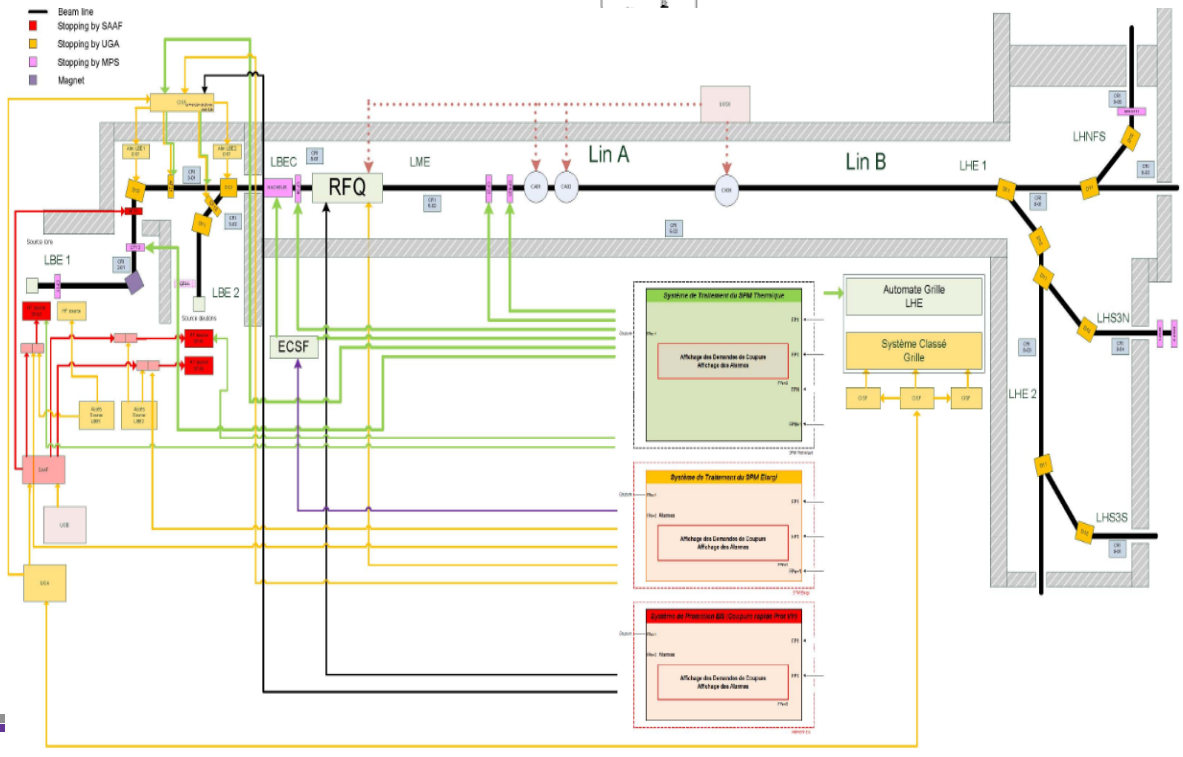
LBEC :
- 1 DCCT

LME :
- 2 ACCT/DCCT
- 12 fentes (T° et I)

LINAC :
- 2 ACCT/DCCT (LME et LHE)
- 20 BPM
- 20 BLM

LHE :
- 2 ACCT/DCCT
- 12 anneaux de pertes
- 12 BLM
- 1 TOF
- 2 MIGR
- 1 trèfle
- Thermocouples





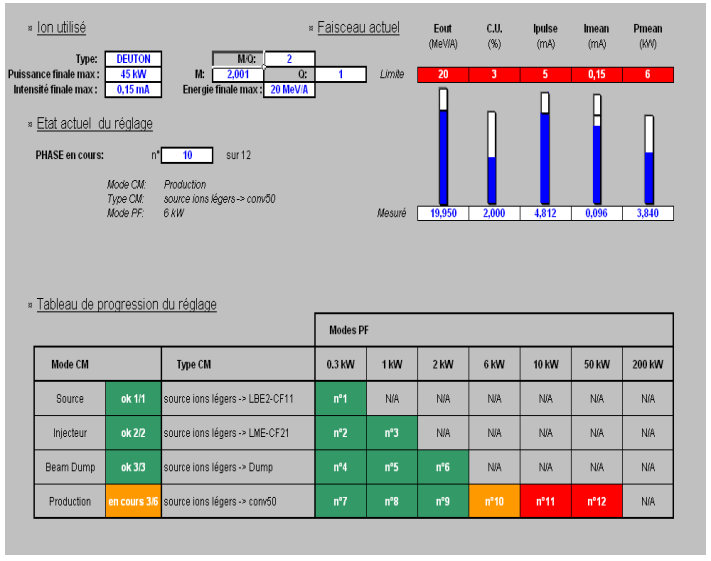


Tableau de progression du réglage

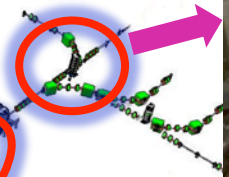
Mode CM		Type CM	Modes PF 0,3 kW	1 kW	2 kW	6 kW	10 kW	50 kW	200 kW
Source	ok 1/1	source ions légers -> LBE2-CF11	n°1	N/A	N/A	N/A	N/A	N/A	N/A
Injecteur	ok 2/2	source ions légers -> LME-CF21	n°2	n°3	N/A	N/A	N/A	N/A	N/A
Beam Dump	ok 3/3	source ions légers -> Dump	n°4	n°5	n°6	N/A	N/A	N/A	N/A
Production	en cours 3/6	source ions légers -> conv50	n°7	n°8	n°9	n°10	n°11	n°12	N/A

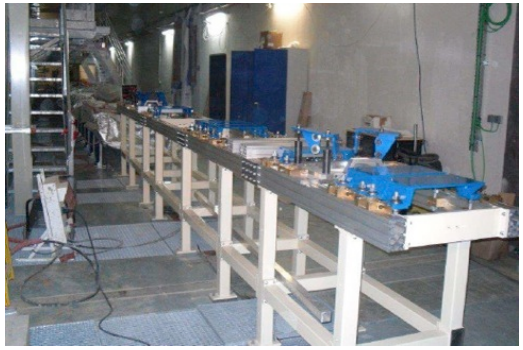
LINAC tunnel

Installation is going on

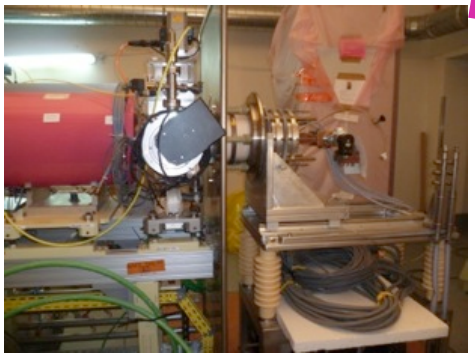
Beam lines & support

SC Cavities

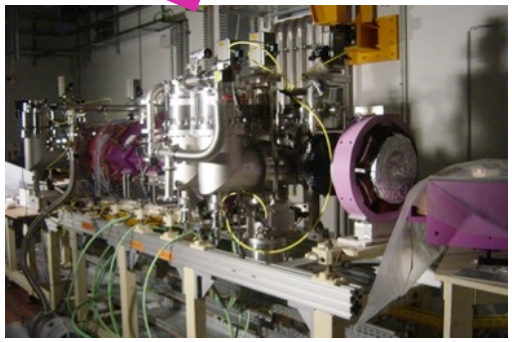


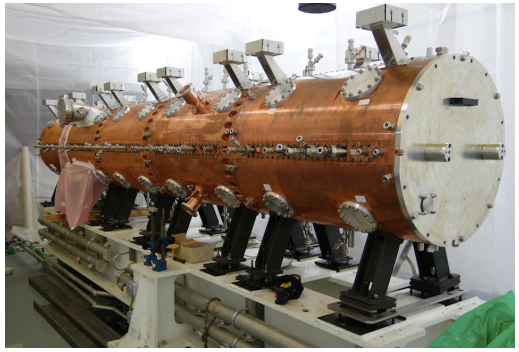


HI ECR Source



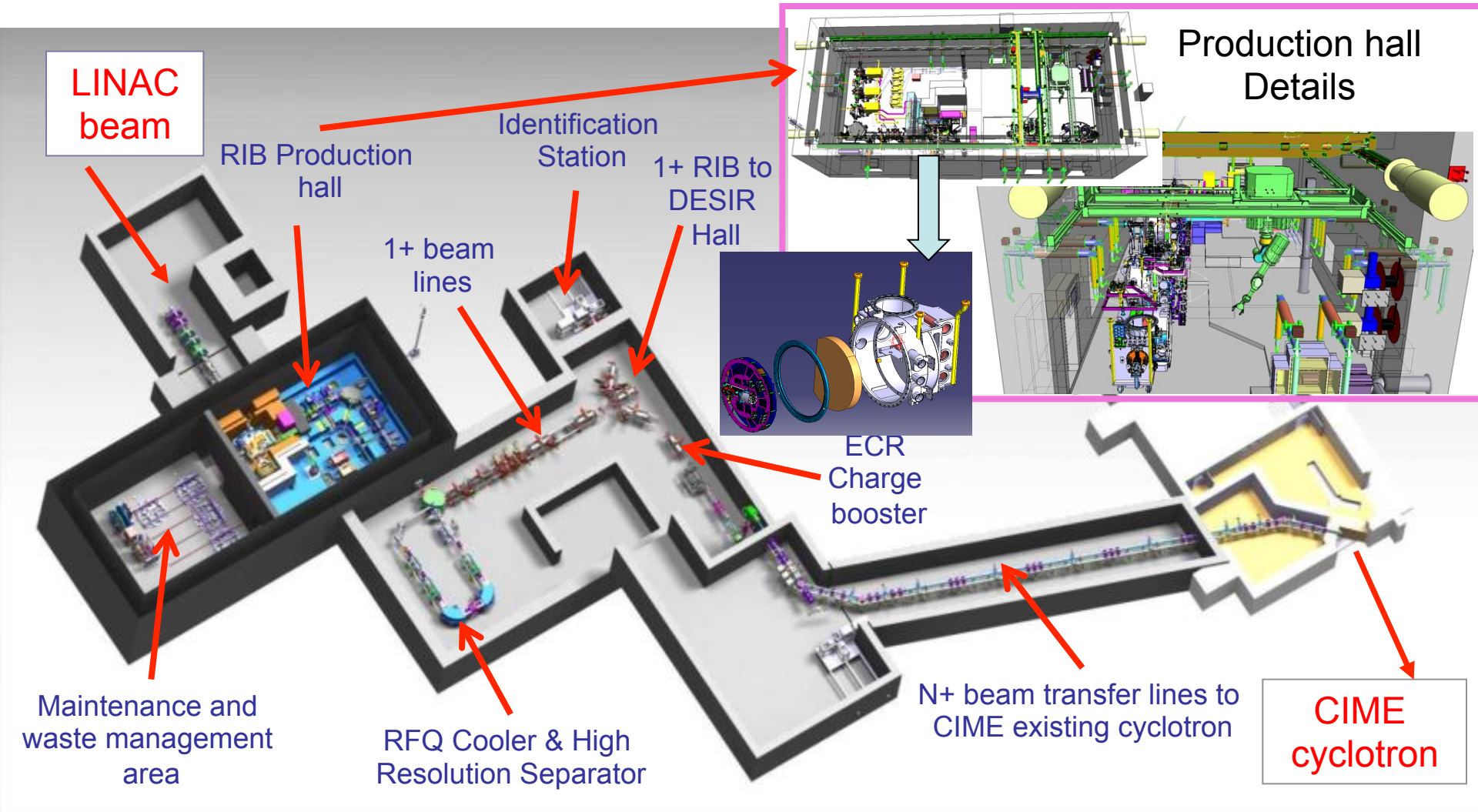
LI ECR Source



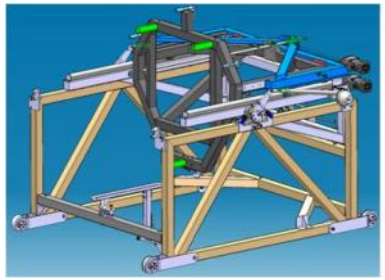


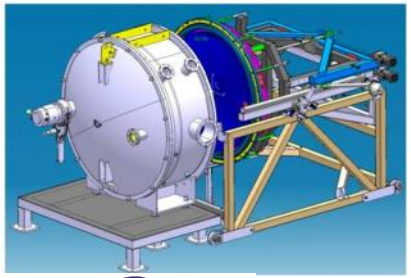
RFQ

Handling of high radioactivity and maintenance

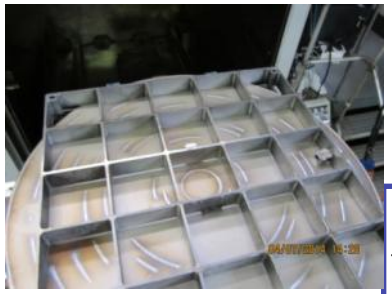


High-power converter and big volume UCx target

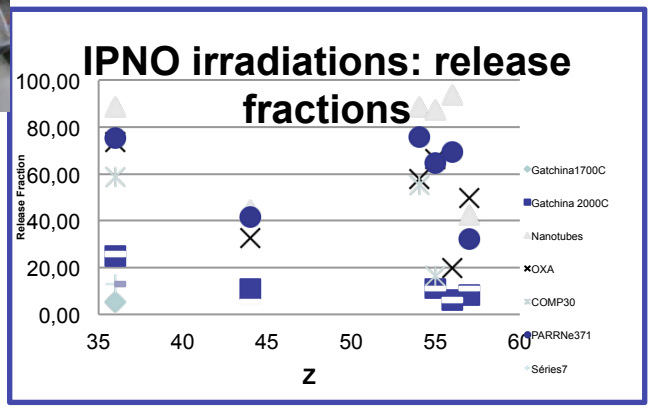




- Uranium carbide target**s** constructed and irradiated!
- Release times < 50%
- Structures understood!



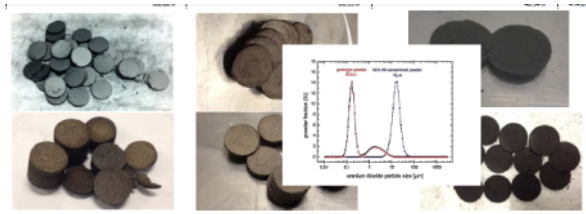
INFN
Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali di Legnaro

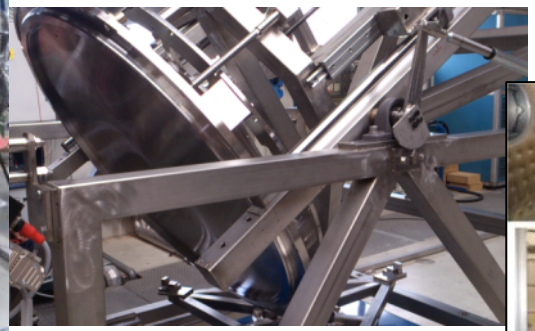


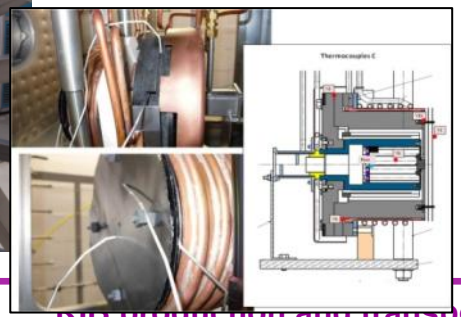
ISOLDE

SPES exotic beams for science

IPN INSTITUT DE PHYSIQUE NUCLÉAIRE ORSAY



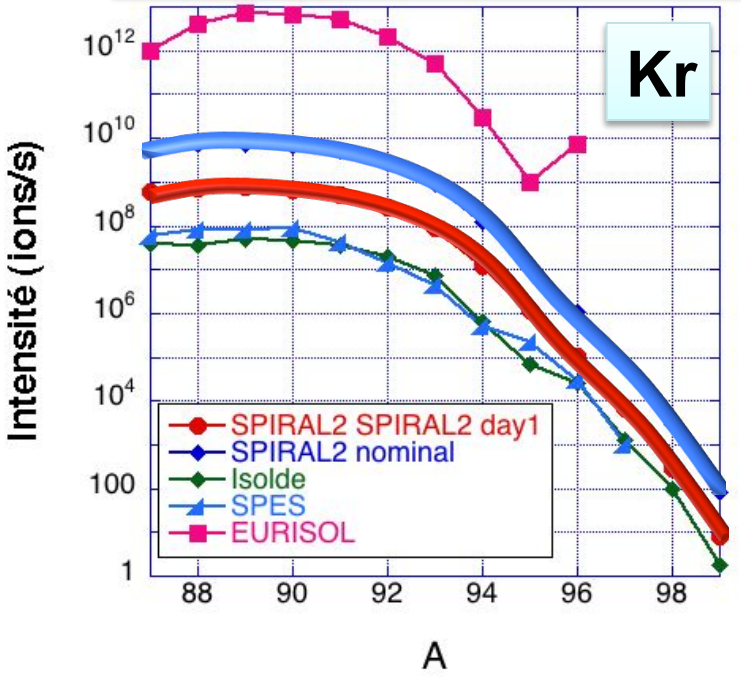




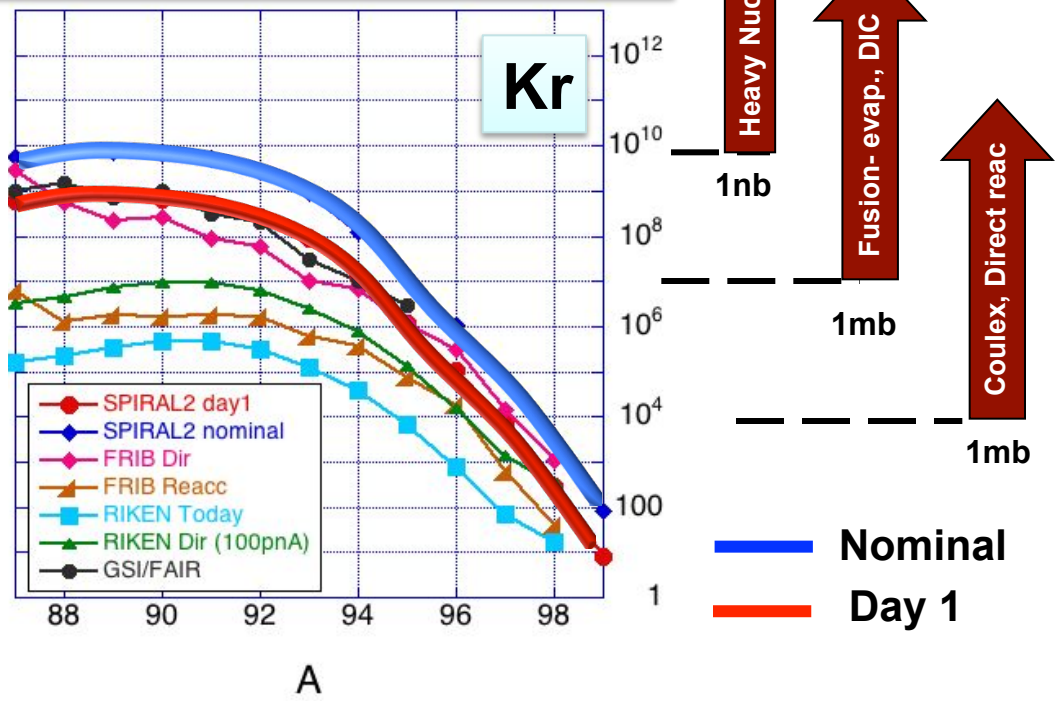
SPIRAL 2 Phase 2: High-intensity ISOL RIB facility

SPIRAL 2: Experiments with RIB at low cross sections and very exotic nuclei at few MeV/nucleon

SPIRAL2 – ISOL facilities



SPIRAL2 – In flight facilities



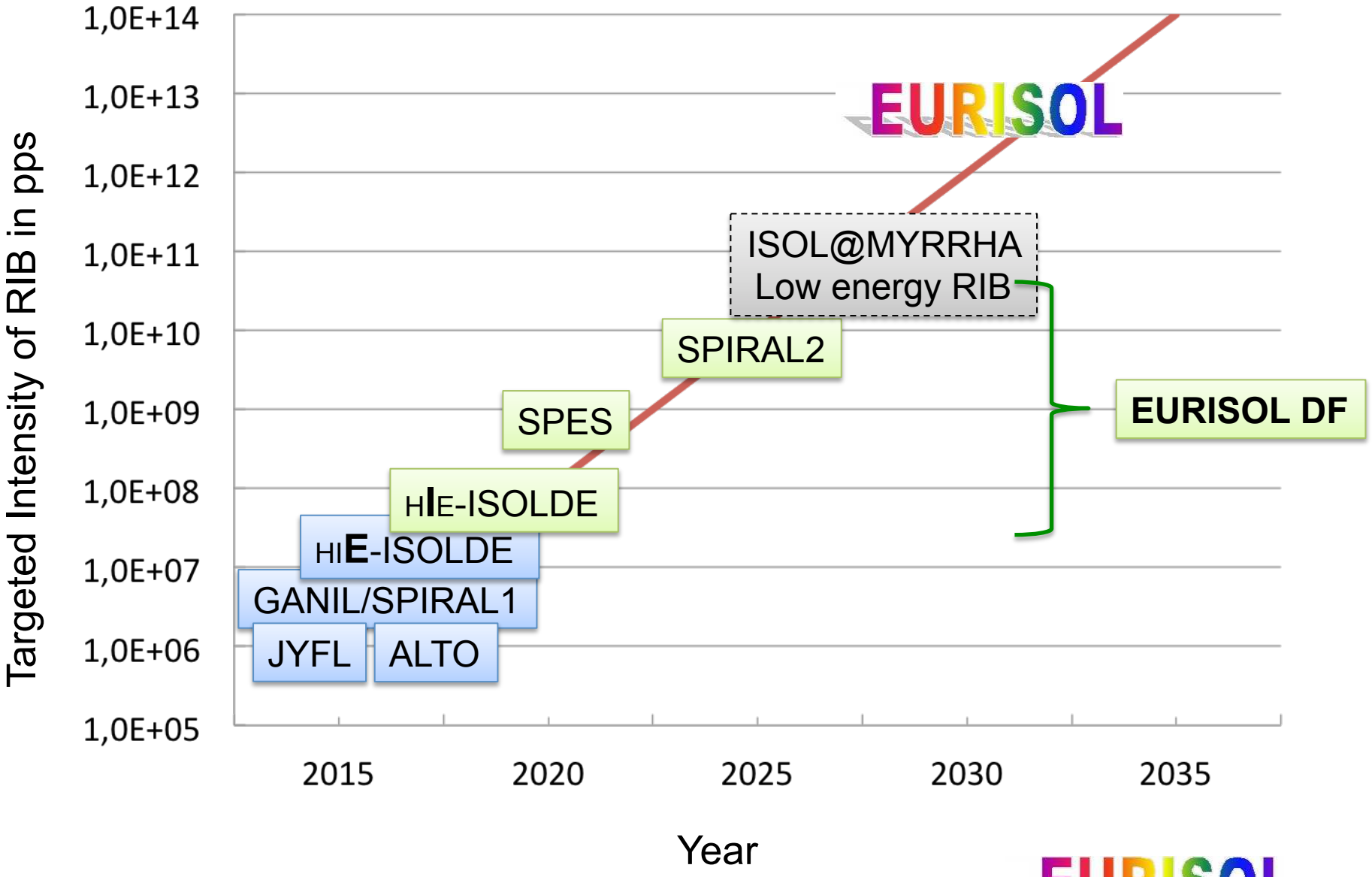
ISOL RIB beams:

- high intensity, optical quality & purity

Versatility:

- light & HI, high-intensity stable-ion & RIB
- Multi-beam capabilities,
- Months of beam-time
- World-class arrays & detectors

EURISOL DF: Intermediate step towards single site project



EURISOL DF

GANIL/SPIRAL 2 facility: status & outlook

Phase 1 Commissioning/ experiments from 2015

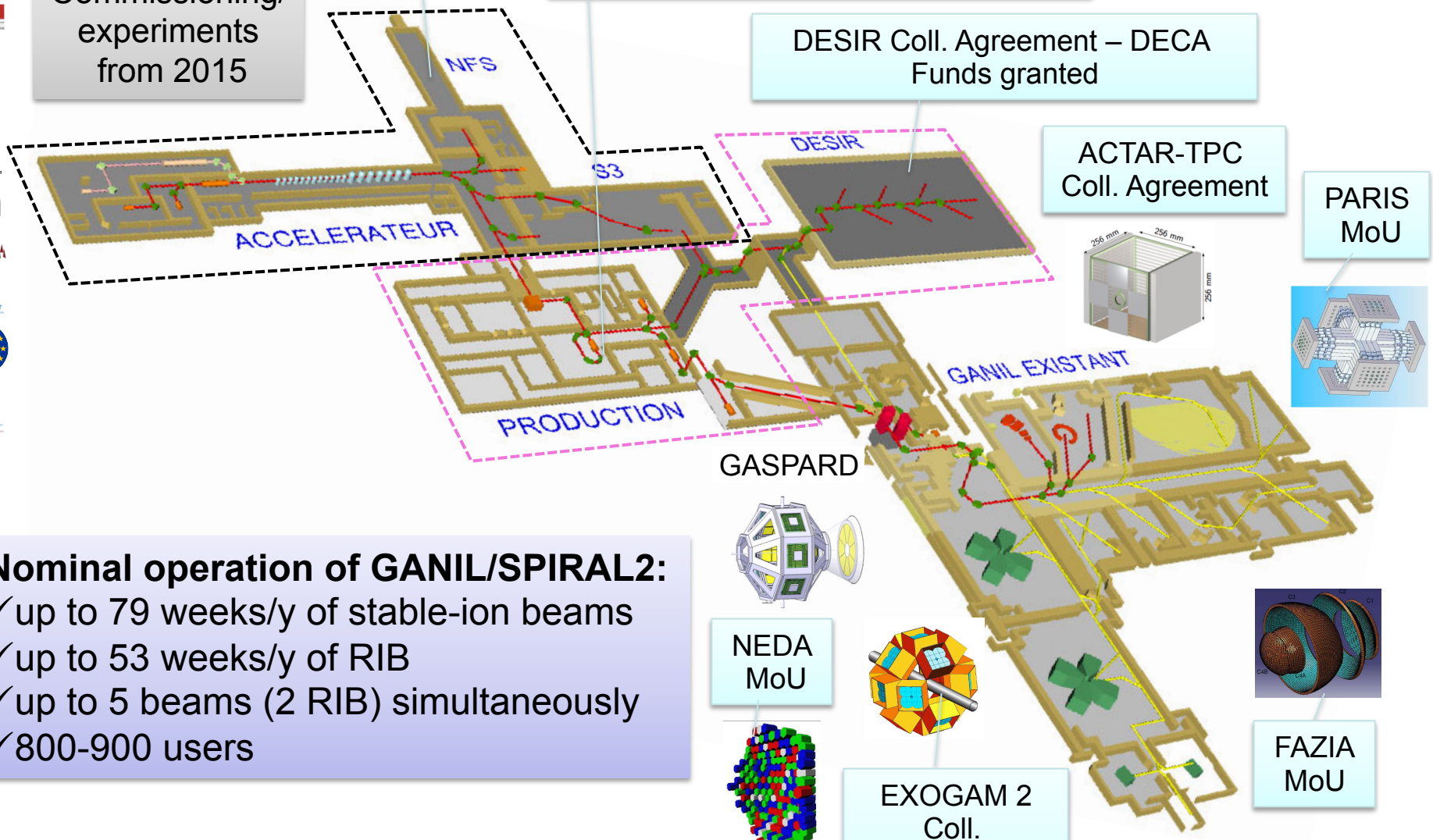
NFS MoU

S3 EQUIPEX ANR CONVENTION – Funds granted

DESIR Coll. Agreement – DECA Funds granted

ACTAR-TPC Coll. Agreement

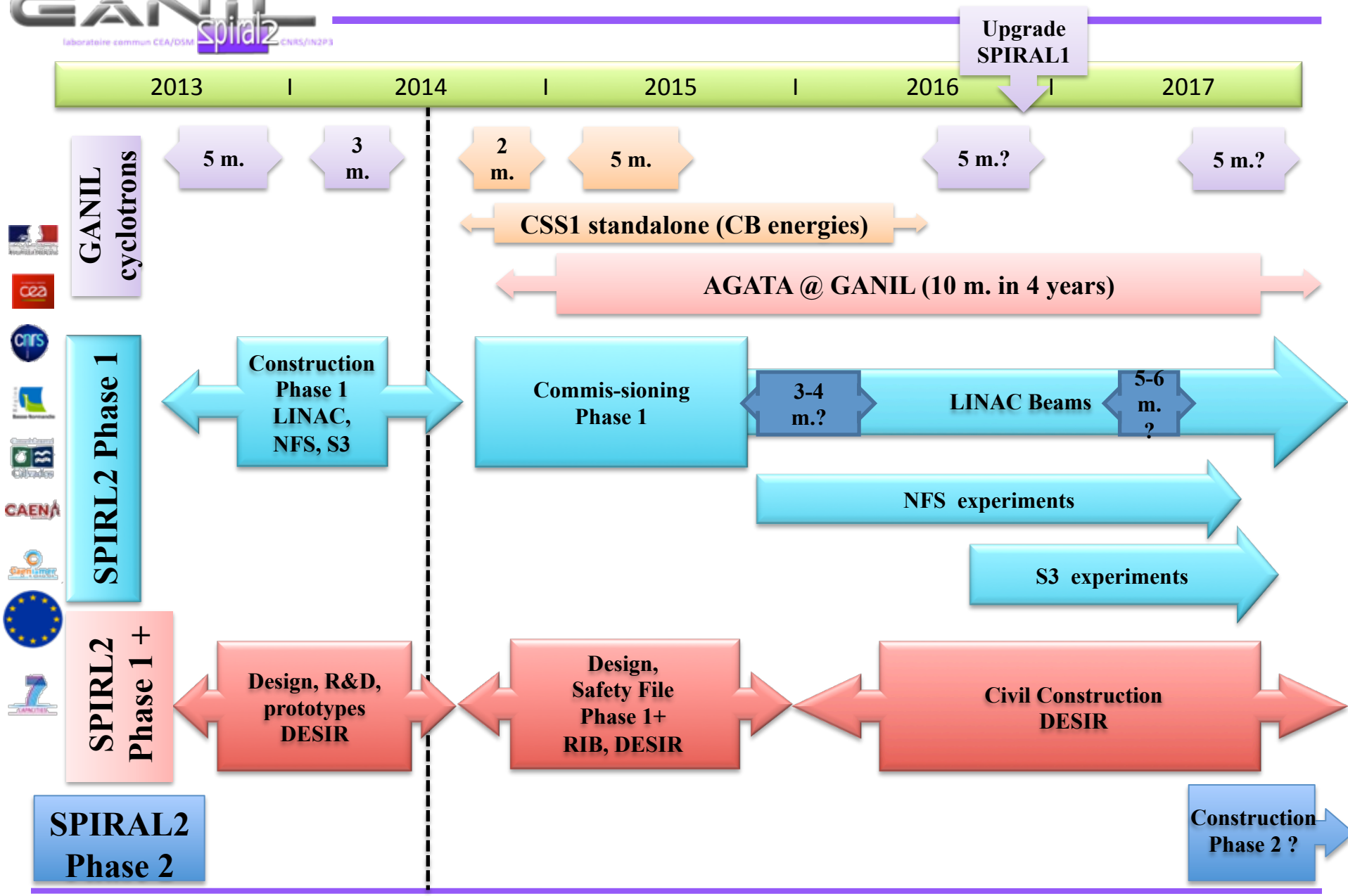
PARIS MoU



Nominal operation of GANIL/SPIRAL2:

- ✓up to 79 weeks/y of stable-ion beams
- ✓up to 53 weeks/y of RIB
- ✓up to 5 beams (2 RIB) simultaneously
- ✓800-900 users

Timeline GANIL & SPIRAL2



GANIL/SPIRAL2 in EURISOL DF

- *High intensity accelerator (SPIRAL2 LINAC)*
  - *Operation with very high intensity stable-ion beams*
  - *Accelerator Protection System*
- *Handling of the high radioactivity and maintenance*
- *High-power 200kW converter and big volume UCx target (SPIRAL2 Phase 2)*
- *Very high intensity RIB (SPIRAL2 Phase 2)*
- *Innovative Instrumentation (ACTAR, PARIS, GASPARD, spectrometers,…)*

Preparation of the EURISOL DF project for the ESFRI roadmap 2018 update

- **Regular EURISOL MOU Steering Committee meetings and actions**
  - Preparation of the proposal for 2017
  - Discussion with representatives of EU member states
  - Lobbying, lobbying, lobbying
- **Tight links with EURISOL User Group and EURISOL JRA in ENSAR2**
- **EURORIB 2015 conference – dedicated session**
- **Dedicated EURORIB DF conference in 2016 with a "EPS label" in collaboration with Nucl. Phys. Board of EPS**