



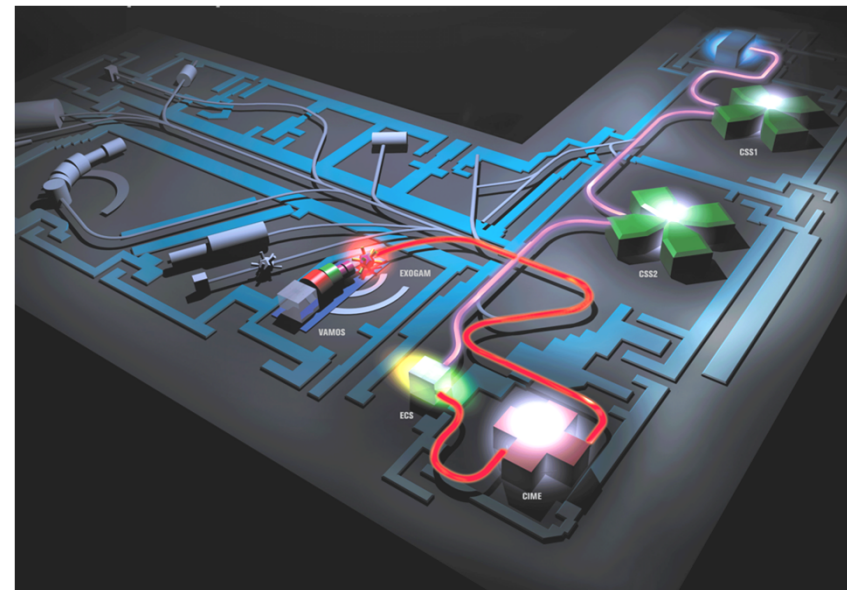
ECPM 2012  
Paul Scherrer Institut  
Switzerland  
May 9-12, 2012

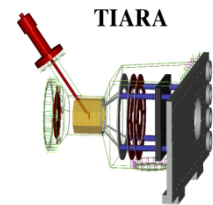
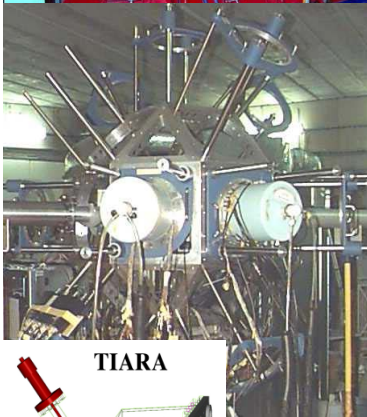
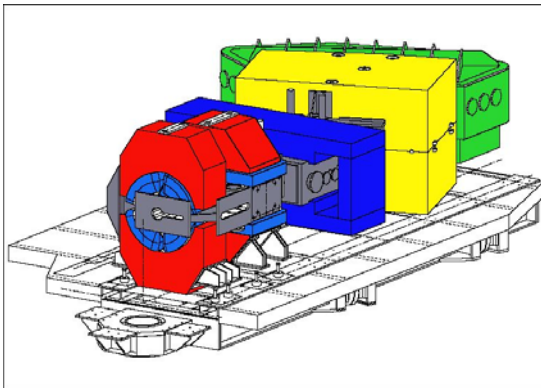
# SPIRAL2 ARRIVAL CONSEQUENCES ON THE EXISTING GANIL INSTALLATION

*F. Chautard*

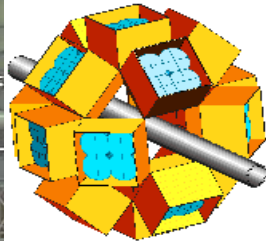
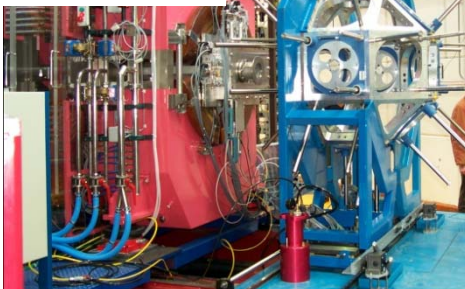
*(on behalf of the Accelerator Service)*

- ◆ GANIL OPERATION STATUS
- ◆ SPIRAL1 / UPGRADE
- ◆ SPIRAL2 INTERFACES





TIARA



XOGAM

G4

G3  
SPEG

VAMOS

L4  
L5

CIME

SPIRAL

L3

ECS

SISSI

CSS2

R2

L2

Eplucheur

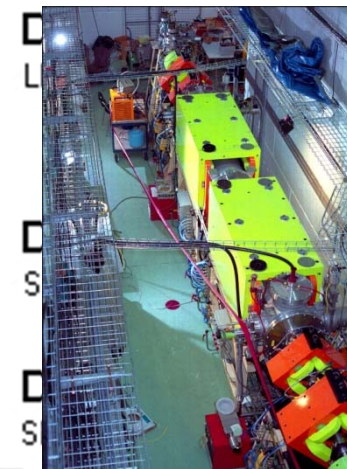
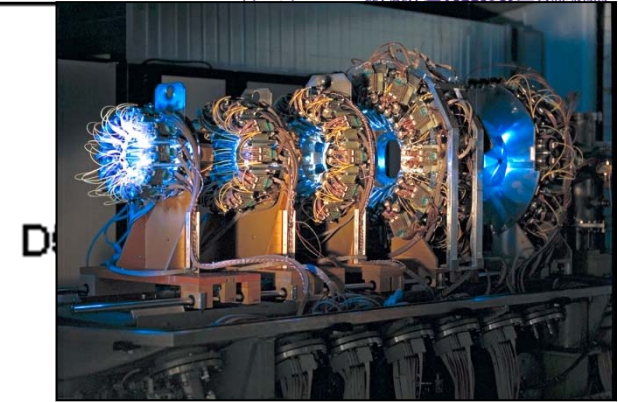
CSS1

R1

L1

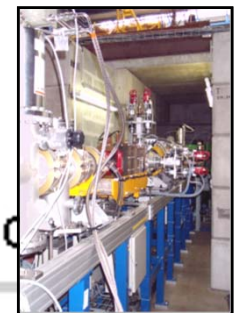
C01

IRRSUC



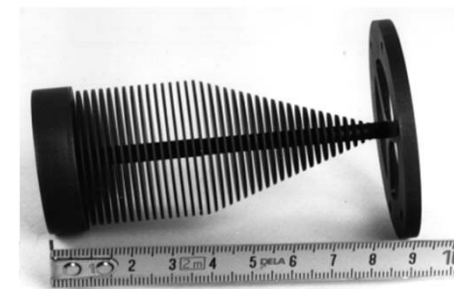
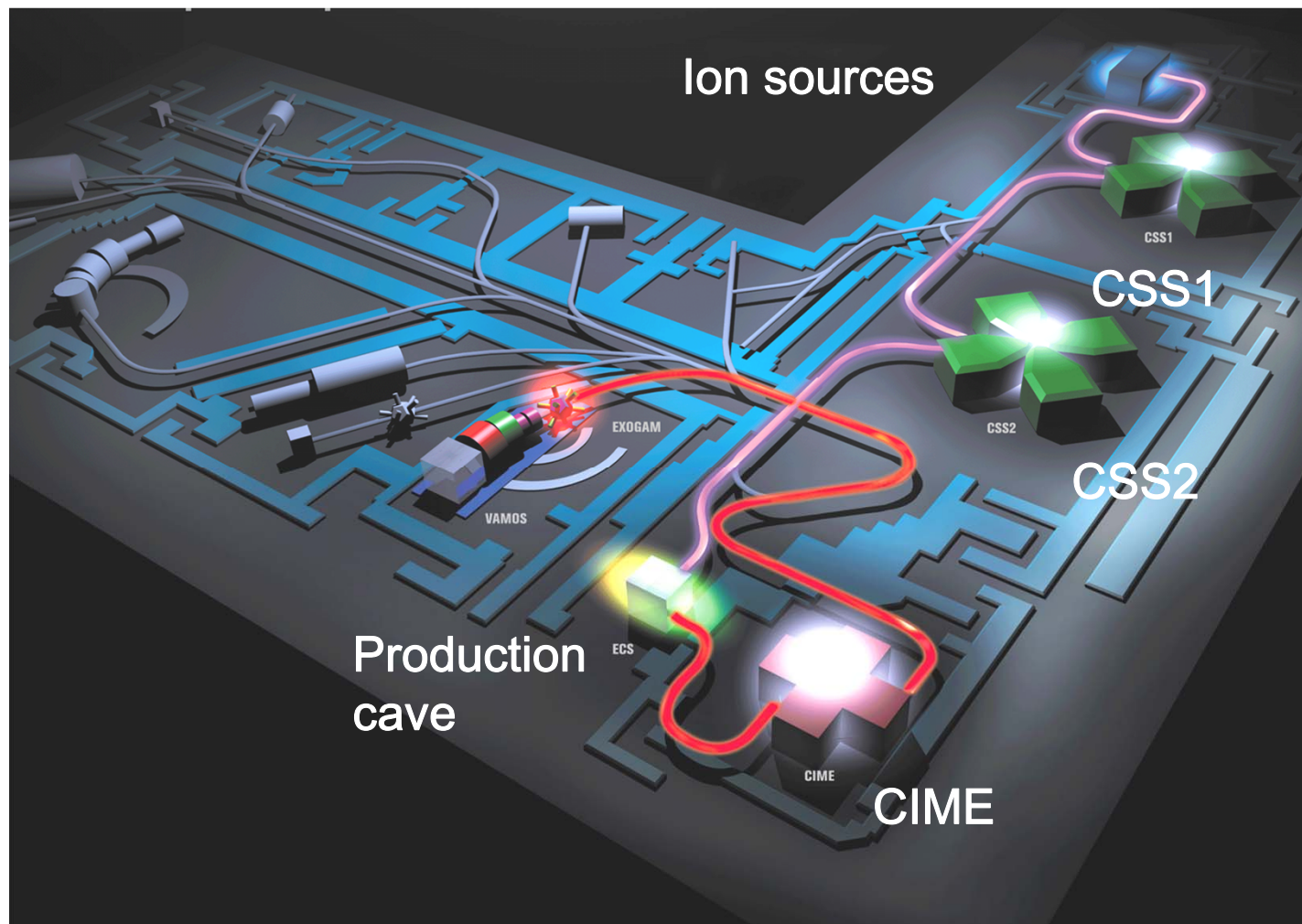
INDRA

IRRSUD





# EXOTIC BEAM PRODUCTION AT GANIL: SPIRAL1 SINCE 2001



# RUNNING STATISTICS 2001-2011

**GANIL per year:** 32 weeks within 4 runs: 5700h of operating time. Leading to 7200h of beam time for users (multi-beam effect)

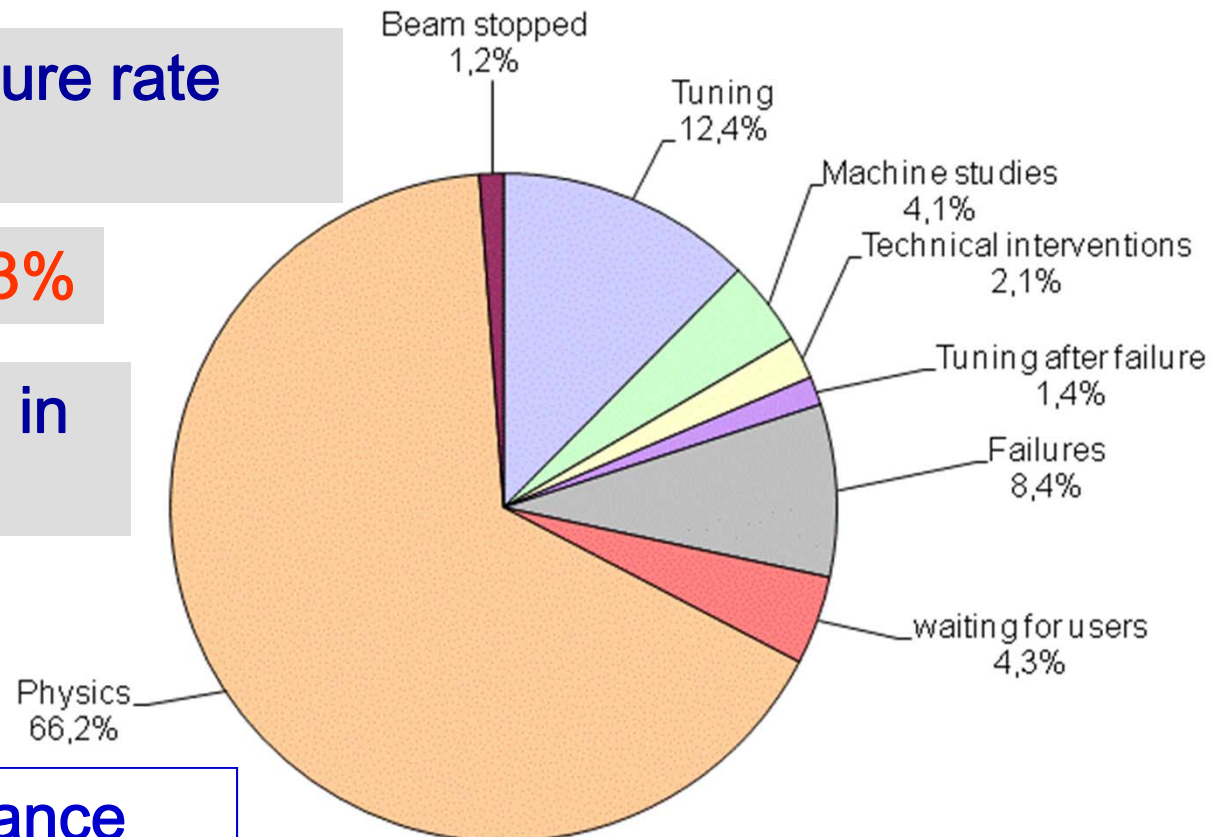
**SPIRAL since 2001:** 8500h of exotic beams. More than 30 exotic beams produced

Availability rate = 1 – failure rate  
over 11 years: **90.2%**

Availability in 2011 : **93.3%**

Scheduled physics time in  
2011 : **98.4%**

**Great effort on maintenance**

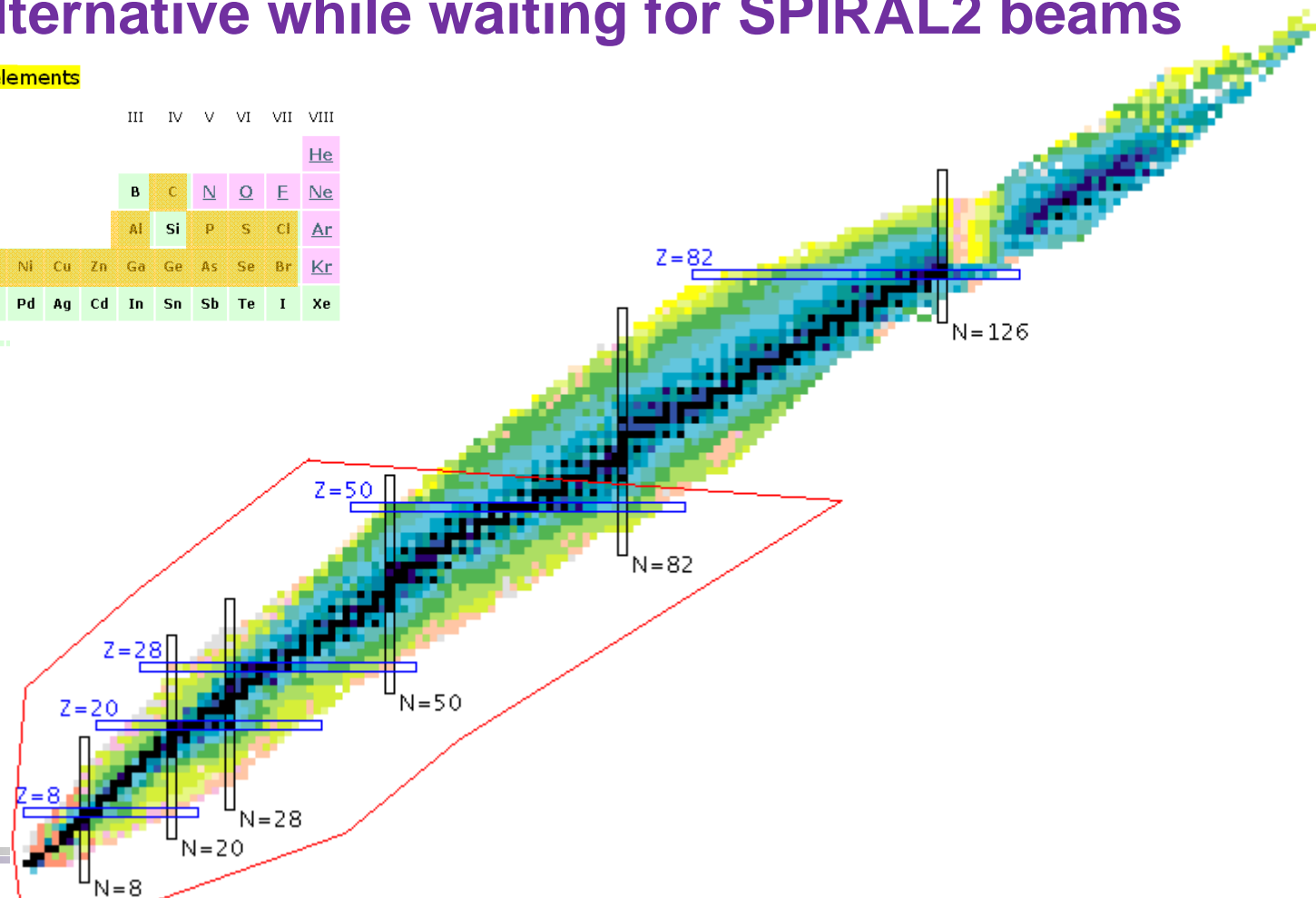


# AFTER 10 YEARS OF SPIRAL1...

- ◆ The physicists are waiting for an extended range of available radioactive beams
- ◆ Keeping the existing capability of production
- ◆ And is an alternative while waiting for SPIRAL2 beams

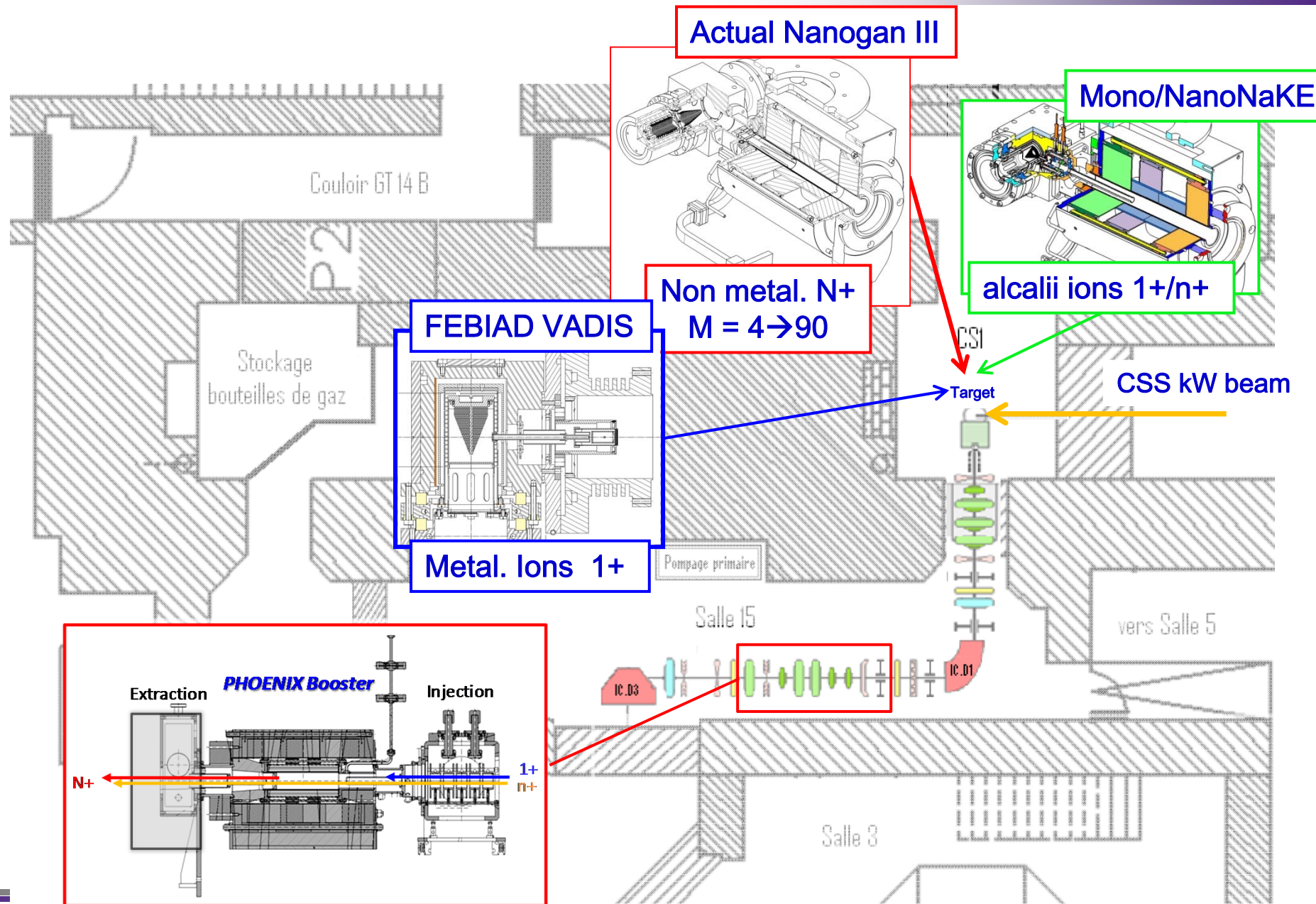
Table of elements

	I	II											III	IV	V	VI	VII	VIII	
1	H																		He
2	Li	Be											B	C	N	O	F	Ne	
3	Na	Mg											Al	Si	P	S	Cl	Ar	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
5	Rb	Sr	Y	Zr	Nb	Mo	Te	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	





# PROJECT UPGRADE SPIRAL1 : 2014



# CHALLENGE OF THE PROJECT

## ◆ Initially a Simple and Good idea

but :

## ◆ Major modification of the existing installation :

- New radioactive beams meaning an update of the GANIL Safety report
- Modification taking into account the new security regulation

**Take times... Then when ready ...**

- ◆ Human resources no more available and on SPIRAL2 project
- ◆ Consequence on the planning : 2 years delay

## 3 missions of the Accelerator Service:

- ◆ Operation
- ◆ Accelerator Development
- ◆ Participation of the SPIRAL2 project (growing fast)



- ◆ Reduction of the running time : to free human resources from the existing accelerators (10 engineers, 18 operators...)

2010 : ~8 months

2011 : ~6 months

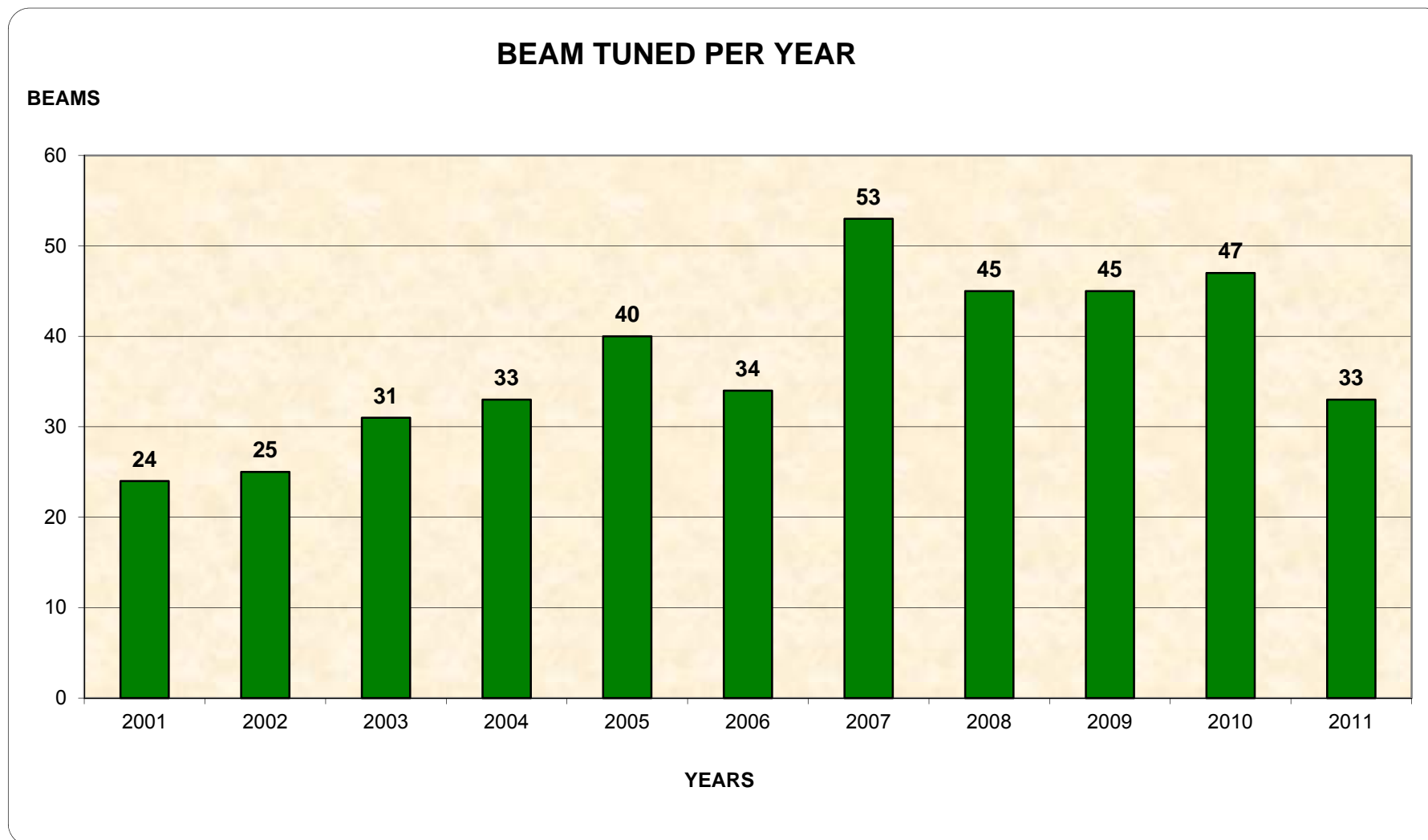
2012 : ~4 months

2013 : ~6 months

2014 : ~8 months

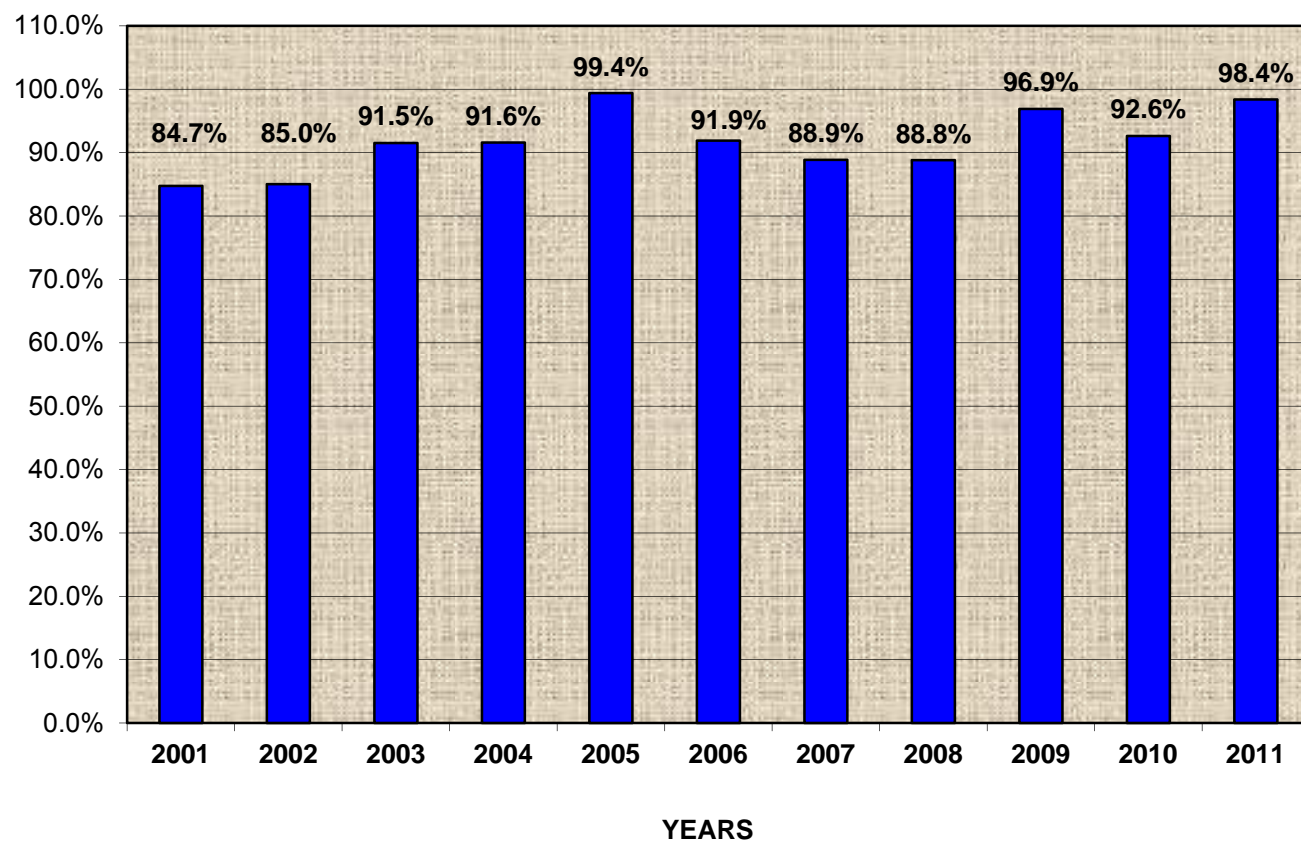
- ◆ Reduction of new beam developments
- ◆ Reduction of maintenance time of the existing machine
- ◆ Limitation of new developments in accelerator : UPGRADE SPIRAL1

**Concentration of forces on the new project**



## ... BUT STILL EFFECTIVE

**RATIO OF BEAM AVAILABLE TO PHYSICS over  
THE SCHEDULED ONE**





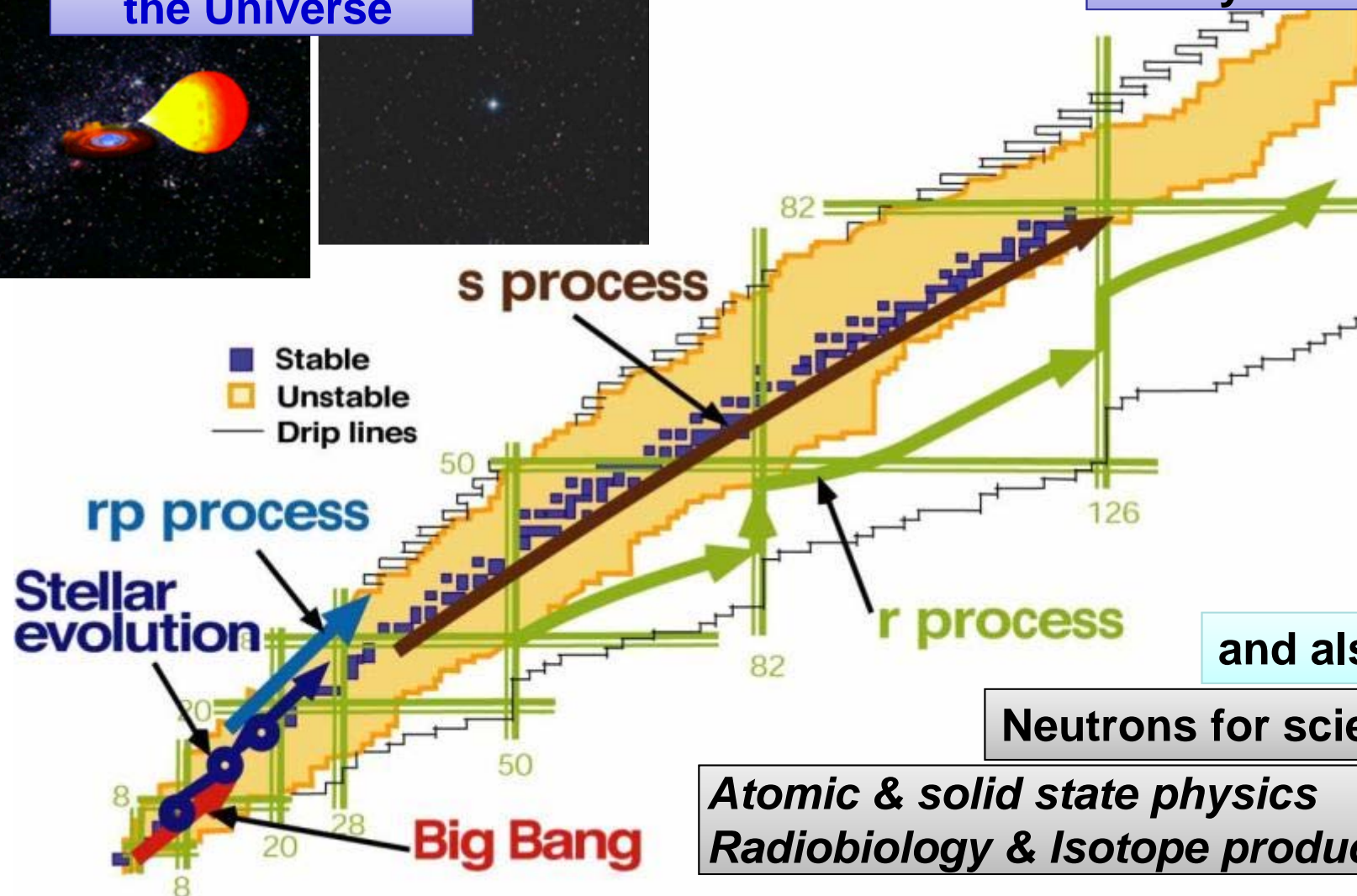
# SHORT OVERVIEW OF THE SPIRAL2 PROJECT

# SCIENTIFIC CASE OF GANIL/SPIRAL 2

## Nucleosynthesis in the Universe



## Heavy and Super Heavy Elements



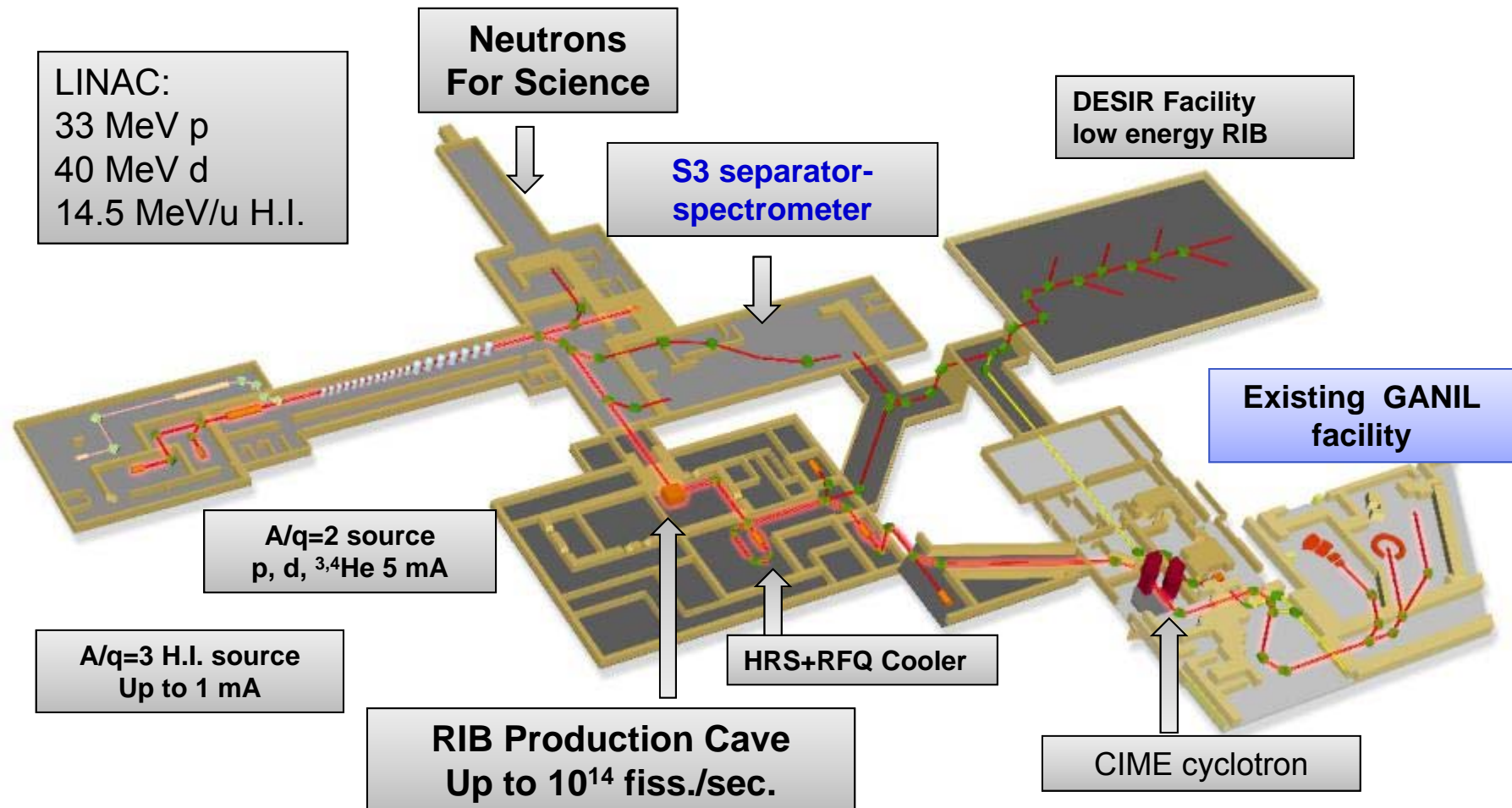
and also...

Neutrons for science

Atomic & solid state physics  
Radiobiology & Isotope production

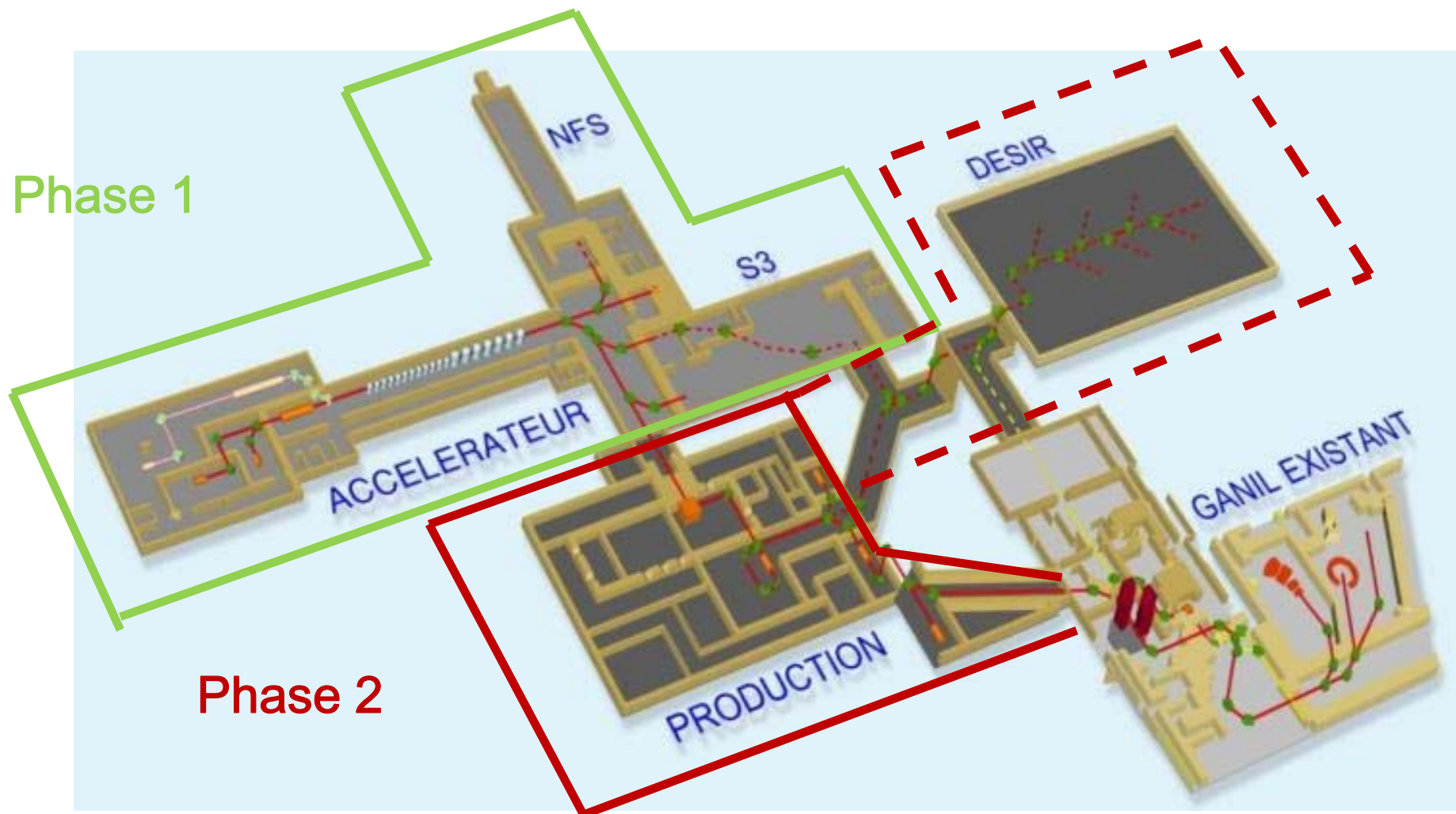
# The SPIRAL2 facility

SPIRAL2 is one of the ESFRI list projects (45 most important EU research infrastructure projects)

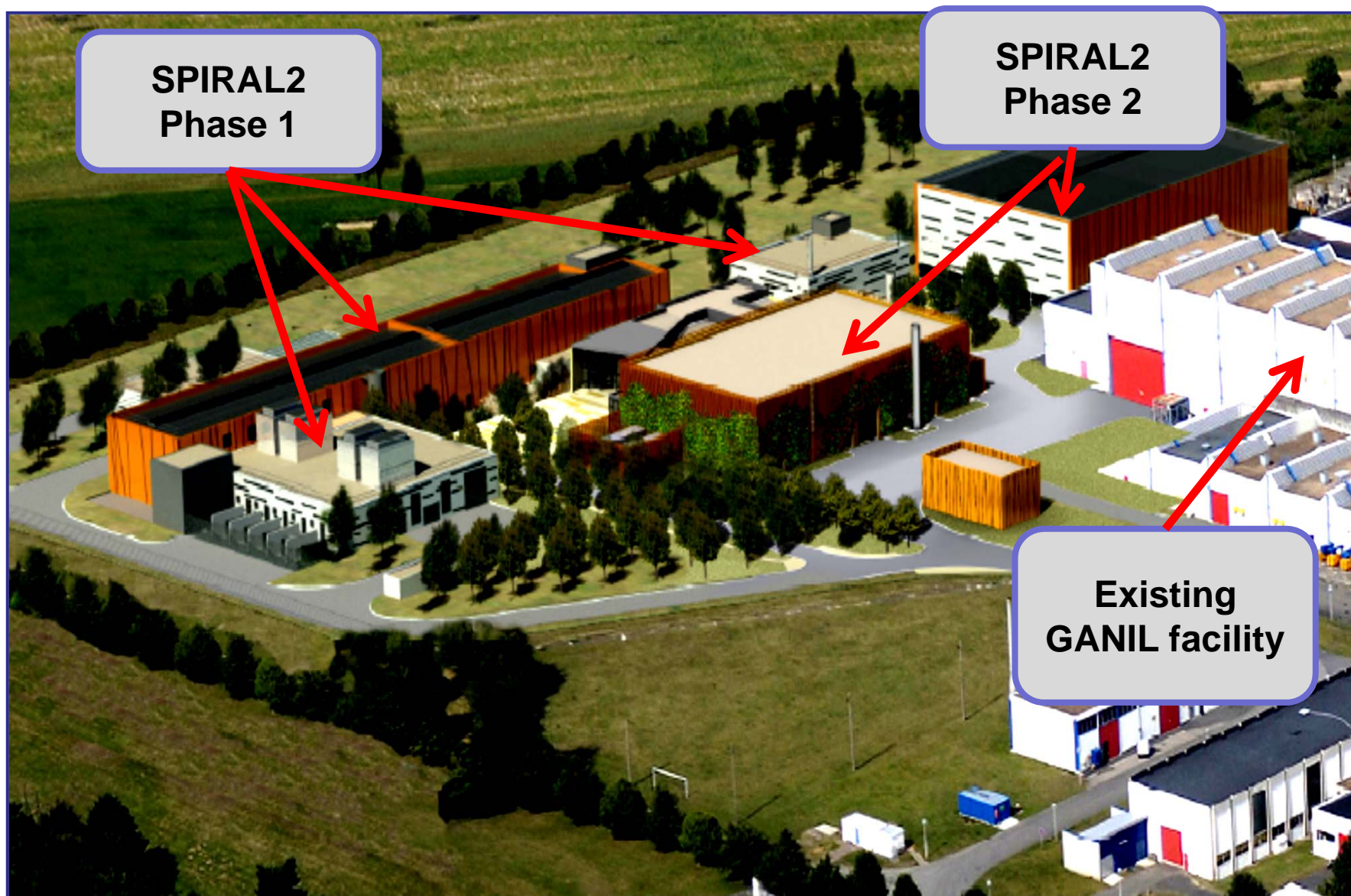




# CONSTRUCTION OF SPIRAL2 IN 2 PHASES



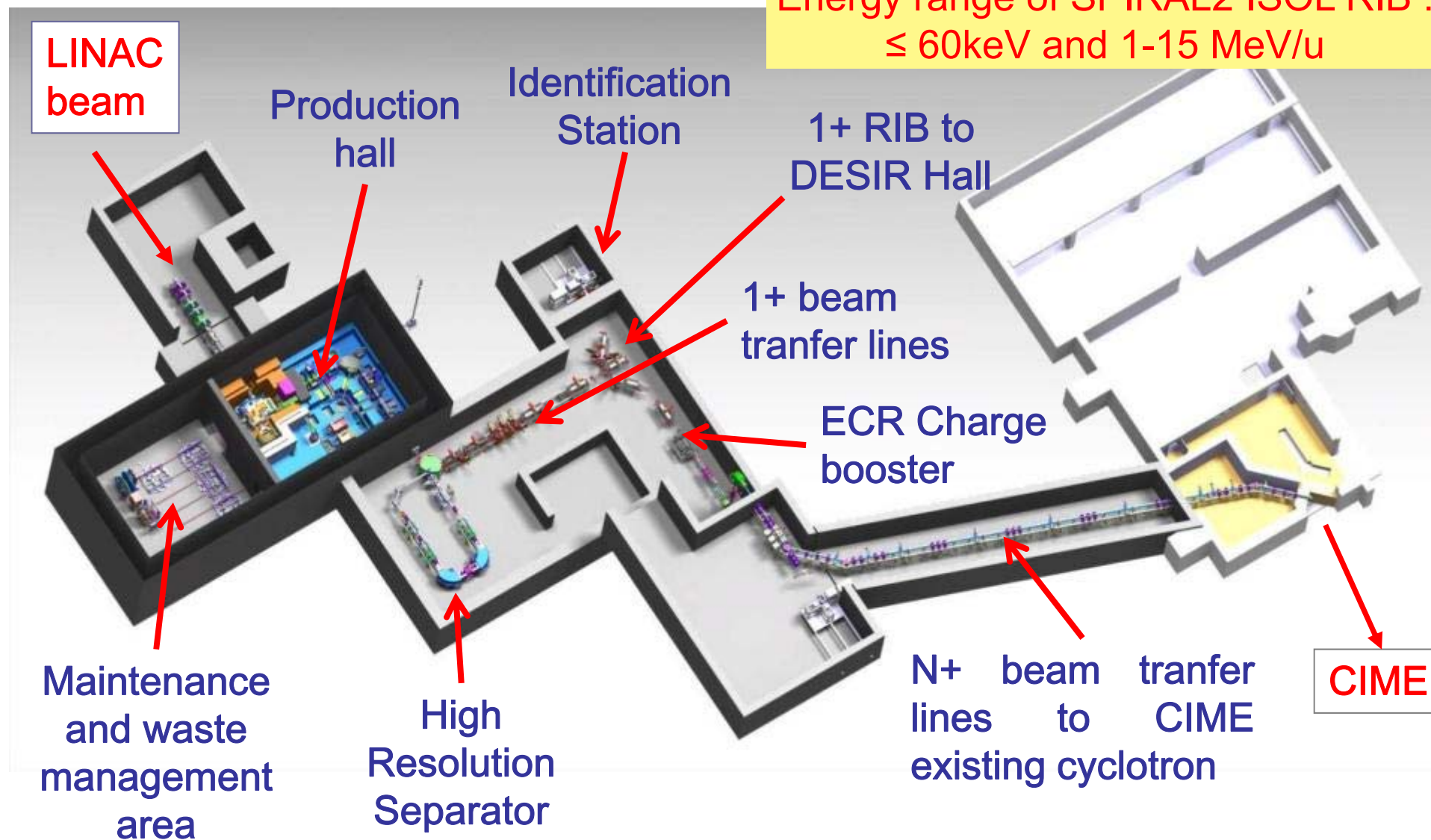
# CONSTRUCTION DE SPIRAL2 EN 2 PHASES





# RIB Production and Transport

Energy range of SPIRAL2 ISOL RIB :  
 $\leq 60\text{keV}$  and  $1\text{-}15\text{ MeV/u}$





## Concerning SPIRAL2 phase1:

- **Phase 1 decree signed may 8, 2012**
- More or less all the equipments are under manufacturing or tests.
- All the tests in laboratories are very important to debug problems before final installation at GANIL.
- Buildings construction has started (pictures next)
- The very important task now is to prepare the installation phase of equipments in buildings.
- Commissioning started in 2013

## Concerning SPIRAL2 Phase2:

- Preliminary studies of sub-systems are completed.
- All detailed studies to be finished by the end of 2012.
- Beginning of construction of equipments and buildings at the beginning of 2014.

## The hole for the buildings









# STATUS OF BUILDINGS CONSTRUCTION



*Thank you for your attention*